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REVIEWS

A Collection of Dispatches, Reports, Instructions, and Memoirs of the Ambassadors of France in England and Scotland, during the Sixteenth Century, preserved among the Archives of the Kingdom in the Royal Library (Paris), and now first published under the Superintendence of Mr. Charles Purton Cooper —[Recueil des Dépêches, Rapports, &c. &c.] Correspondence of De la Mothe Fenelon. Vols. I. & II. Paris: Hector Bossange & Co.; London, Dulau.

THESE volumes are the first of a series, in which it is proposed to include all the inedited diplomatic documents of the French ambassadors at the courts of England and Scotland during the sixteenth century. A collection, as truly remarked in the preface, which being both contemporaneous and official, will present "history herself, tracing from day to day, almost from hour to hour, events as they arose." The dispatches of Bertrand de Salignac de la Mothe Fenelon, who was ambassador at our court from 1568 to 1575, have been selected for the commencement of the series; and the two volumes before us contain his reports and dispatches for the years 1568 and 1569. An idea of the magnitude of this work, (and, indeed, of its historical value,) may be formed from the circumstance of these dispatches, for seven years alone, filling five small folio volumes, although written in a small hand, and abounding in abbreviations.

At the period when these dispatches commence, England and France, although ostensibly at peace, were in reality in a state of armed neutrality. The conduct of the French court towards the Huguenots had excited the anger of the English, and the secret supplies of money which Elizabeth had sent to aid the struggle of the reformed faith, had irritated the French monarch. The detention of Mary of Scotland, too, had offended the pride of France; and when De la Mothe Fenelon set out on his mission, he seems to have been directed to keep a vigilant eye on every proceeding respecting her. On the 7th of November 1568, the new ambassador reached England, and on the 14th his first interview with Elizabeth took place at "Hampton Court." In the dispatch addressed to Catherine, the queen-mother, De la Mothe relates how earnestly Elizabeth inquired after her health—how rejoiced she was that the king had recovered from his illness—"that God knew the regrets she had on account of the disquiets of your kingdom," which seems to have been pushing civility a little too far, since both the ambassador and his royal mistress must have considered that she had aided in producing these very disquiets. Nothing is mentioned in this dispatch relative to Mary of Scotland. In the next, he informs the king that he had heard that the castle of Tutbury was about to be victualled, and that as the Earl of Huntingdon, the governor, was "most passionate for the new religion," he feared it was intended to remove her there. In his next, he reports that a meeting had been held at Hampton Court "upon the affairs of the Queen of Scotland;" and he gives his opinion that the example of a queen being brought to trial, would be a precedent "sufficiently to the prejudice of those in supreme authority." In his dispatch to the queen-mother, he urges that a good advocate from Paris, well instructed in the case, be dispatched to assist the queen in her defence. In the sixth, dated 15th of December, he gives notice that "four great ships" have sailed, and that some say they were bound to Rochelle with arms and powder for the Prince de Condé. He also states that the question of peace or war had been debated in council; and, in the next, he writes:—

The Spanish ambassador, who is here, has told me that having earnestly performed the office which his master had commanded him,—to notify to the queen neither to harass nor molest you in any way during this war which you have with the Prince of Condé and certain of your subjects; that she had replied that she was entirely your good and great friend, desiring the prosperity and establishment of your affairs, and that she had no intention to injure you, or to declare against you; but that she could not abandon those of Chatillon, who, for so long time were her friends; and she would also truly say to him, that she held those of the house of Guise for such declared enemies to her and her realm, that she could not assure herself, seeing that they had such great authority as much in arms as in council in France, that some one of your council had not said, that after you had appeased and settled the religious strifes of your kingdom, you intended immediately to do the same in England; and that she liked better to foresee than to be foreseen. This, Sire, I will just touch upon in my next audience, which she has granted me for next Wednesday.

Accordingly, De la Mothe mentions to her "what the Spanish ambassador told me." To this she replied, that

She had neither mentioned the name of Guise nor of Chatillon to the Spanish ambassador, but that, possibly, he had understood so from her remarks; then she said that she neither feared the one party, nor expected aught from the other, well as she knew the different feelings they bore towards her; and since that your majesty sought by this war only to recover the obedience of your subjects, she prayed God to give you all good and happy success in your enterprise, considering that she should act against her conscience in injuring you, and that God might justly punish her in that by which she had offended. Dr. Junius, who was here for the Count Palatine, and the messengers of the Duke de Deux Ponts and the Prince of Orange, have returned, and, I presume, have carried away a report similar to that which I had,—it is, that this queen will not declare herself openly against your majesty, nor against the king of Spain, but, that if they form a league against her religion, she will willingly enter upon the defence of that.

The same dispatch (the 8th) contains a private letter to the queen-mother, in which the following account is given of the project to overthrow the influence of the most upright, and, therefore, most impracticable of Elizabeth's ministers, Cecil.

The aforesaid Spanish ambassador has come to treat with me respecting what may here concern the common service of our masters, and has placed before me two things, the which he considers very important, and almost necessary to Christianity; the one is, that not knowing, as he says, so great a heretic in this world, nor one more adverse to the Catholic religion, than Mr. Cecil, it is necessary that on my side, in the name of your most Christian majesties, as also he on his side, in the name of the Catholic king, that we shall labour to cause him to lose his place, and that favour and credit which he has with the queen his mistress. To this, I replied, that I should be always ready to serve the cause of the Catholic religion, in all that might be possible; and that it was necessary to watch in what manner we might begin this business; for the said lady had confided her affairs solely to the said Cecil, and that a prince would with difficulty be induced to change such a confidential minister, when he suited her so well. He replied, that already he had begun by striking a good blow, having obtained one part of the business to be put forward by another secretary than himself, and, therefore, I must not forget to strike my blow when I found an opportunity.

This "other secretary" is, doubtless, Sir Nicholas Throckmorton, who has hitherto been considered as the originator of this plot against Cecil, but in which, from the foregoing statement, it appears he was merely a subordinate agent. But there was a second proposal of the Spanish ambassador:—

A conjoint resolution to interdict her [Elizabeth's] subjects all traffic and commerce in France, Flanders, and Spain, unless they return to the Catholic faith, and to the obedience of the Roman church, which will constrain, of necessity, all the kingdom to return to it. * * In regard to Cecil, it is true that he is passionately attached to the new religion, and that it would be well if one of more moderate opinions held his place near his mistress; but I do not see that it will be convenient to remove him, because of this,—it is said that he dissuades his mistress from war with France, and is so strongly supported by the Earl of Leicester, who professes to be wholly your servant.

For some time no farther notice is taken of either of these plans; meanwhile the conduct of the Duke of Alva, in seizing the English merchants and their goods in the Low Countries, excited great irritation in London, and strengthened the hands of the Cecil party. De la Mothe notifies the seizure on the part of Elizabeth of five vessels from Biscay, laden with wool, and preparations for war were made, and also a league formed with the Earl Murray, for the protection of James during his minority. To this succeeds the notice of the arrest of the Spanish ambassador; and he remarks how injurious to the cause of the Queen of Scots all these events will prove. The following extract, from the thirteenth dispatch, gives an account of his first interview with Elizabeth after this, when, having received him very graciously, and received from him an account of French affairs, she—

Enlarged a little bitterly against the authors and promoters of war, saying that princes ought to pursue all such to the death as sworn traitors against them, and pernicious to their realms. To which I replied, that it seemed as though she would charge on the Catholics what I must charge on the other party, who held themselves too firm, and too opposed to the will and wishes of their princes; also, I said, that she could judge better than any other, whether the Catholics of her kingdom had not been very patient and obedient. She proceeded with other remarks in this matter, and then said that this would not apply to the Spanish ambassador who is here; that he had already kindled war between his master's country and her own, and that she had been deceived in him, for she had considered him very honest and very quiet, and had never thought that while she was treating mildly with him respecting the Spanish reals, to place them in safety, after having saved them from the hands of pirates, he had by his letters, of which she had obtained the copy, caused the persons and property of the English to be arrested at Antwerp, commanding this, contrary to the fair words which had passed between them. And he had yet more written concerning her in a different manner to what he ought, having termed her *Oriana* in some of his letters, at which she was not less offended than

at the rest: and if he had been *her* subject, she should already have followed him with judicial rigour; and that the Duke of Alva, also, was too hasty in believing him, and she could not but say that he had proceeded both arrogantly and rashly in the business,—arrogantly, in having merely deigned to write to her a little letter, which the said lady compared to a valentine, and in which there were but five or six words, bearing on the credit of the ambassador; and rashly, inasmuch as, without occasion, he had executed an acknowledged act, not only of seizure, but of hostility, towards her subjects. That the Duke was not so great, nor herself so little, nor the affair so unimportant, that he might not have taken the pains to have written to her at length, and to have made inquiry as to what had been done here, before attempting this outrage against her and her own; but she trusted so much in the goodness and virtue of the Catholic king, and in the true friendship which has been so long confirmed between them and their kingdoms, that he would not support either what the Duke of Alva had done, or what the ambassador had written.

Notwithstanding this protestation, Elizabeth does not seem to have been so anxious to maintain peace with Spain, as she evidently was in regard to France; but ere long, while peace appeared certain on the part of Spain, Alva having sent the Sieur d'Assoleville to negotiate it, war with France seemed inevitable, a seizure having been made at Rouen of English goods and merchandise. In De la Mothe's dispatch, he remarks that there is great contradiction in the council, many of the principal lords being still anxious for peace; and it is thought the queen is also, while the Protestant party urged an open demonstration in favour of Condé, "to the end that you might be pressed to yield to proposals for peace." The fifteenth dispatch notifies the arrest of Assoleville, and remarks that, to show him that the queen was ready for war, she detained him at Rochester two days, "where, because this is the principal arsenal of the kingdom, he could both see and hear how great a number of workmen she is employing, to prepare with all haste her great ships of war." A levy of 800 horse and 2000 harquebuss men was raised on the borders to aid Earl Murray; and the queen gave notice that if within fifteen days she received no indemnification for the seizure at Rouen, she should forthwith make reprisals.

Ere the fifteen days had passed, De la Mothe had another interview with Elizabeth, in which she complained of the conduct of France; which he answered by complaints of the succours secretly sent to Rochelle; with these she disavowed all participation. He then remonstrated respecting the Queen of Scots having been removed to the castle of Tutbury.

That one of her gentlemen had told me of the rigour used towards his mistress, in taking her from where she was, to put her elsewhere, without allowing her to write a word to the said lady, nor to any of her agents at her court, which had given cause for fear; and that those who counselled her to employ force against the will of one so royal, a sovereign, and a relation, did injury to her reputation. * * She answered me rather angrily, that she had never used force or violence towards the Queen of Scots, and that she had caused her to come to that place that she might be better treated than formerly, when all the provisions had failed; and also, that having intercepted a letter which the same lady had written to Scotland, she had seen that she had commanded certain nobles of the land to take arms, and make an incursion to the place where she was; and she also taxed her with seeking to treat with the Earl Murray, offering to declare him legitimate, and many other things, all false and forged. But, that I might assure your Majesty that the said Queen of Scots had never received aught but good treatment at her hands; and that although *she* needed not to give an account to any person in the world of her actions, nevertheless that she could so well justify herself in all that she had done towards the said Queen of Scots, that every other prince should know that she had conducted herself with that uprightness, that she needed not change her pale colour for aught they might reproach her with; and would to God! that the said Queen of Scots had no occasion to blush when she saw her.

At the end of the fifteen days, Elizabeth's council decided in favour of peace. Her policy, indeed, had always been to avoid an open rupture with France, though she had no objection to send secret aid to the Huguenots. The following, respecting Shakespeare's patron, who was certainly a Catholic, is worth transcribing, as well as the subsequent paragraph, which proves that even at this comparatively early period our mercantile interest had a voice in state affairs, to which Elizabeth and her council deemed it prudent to listen.

Since then, those of the said council have caused to be brought before them another young lord, named my Lord of Southampton, on the count that he had performed the obsequies of a certain tutor of his, with torches and other ceremonies of the Romish church; but observing that he answered very sharply, they judged, seeing his youth, that it was probably done by others, who considered their party very strong; furthermore, as he was son-in-law to Lord Montague, who is wholly Catholic, they have directed his arrest only, and sent two of his household to the Tower.

It will please you, madam, to send us promptly your directions respecting the seizure at Rouen, and the detention of the English at Bordeaux, for the merchants press the queen and those of her council so earnestly for redress, that they will be constrained very soon to take the upper hand by some demonstration; therefore, if you please that peace and our accustomed commerce should continue, and that restitution should be made and justice administered on either side, I hope those who are here will most willingly listen to it.

Appended to this dispatch is a copy of the proclamation, commanding every man to hold himself in readiness to take arms, and which contrasts rather curiously with the assurances of De la Mothe respecting Elizabeth's anxiety for peace. The next notifies that "from thirty-five to forty ships have already sailed with the best seamen of England in them," and also the departure of two fleets of merchant vessels, which he fears are intended to succour the Protestants in the Netherlands. He mentions the arrival of the Spanish treasure, and remarks that "some showed great joy at seeing Spanish treasure locked up in the Tower of London, and others say with sorrow that there are eighty-five firebrands (for that is the number of the loads), which will soon light up a war in this island."

The point respecting the seizure at Rouen still remained unsettled. At length, De la Mothe, at the beginning of March, was directed, in the name of the king, to demand of Elizabeth an answer within fifteen days, as to peace or war. Elizabeth replied, that much as she desired peace she must refer it to her council; and, after deliberating seven days, they determined for peace.

In the second memoir accompanying this dispatch, is the following account of the end of the conspiracy against Cecil, which certainly differs in many particulars from that commonly received. After mentioning that the lords determined to bring as a charge against him that he had advised the detention of the Spanish treasure, and in consequence exposed the country to war with both France and Spain, he proceeds to say, that the queen directed her council to be summoned—

To determine these matters; Cecil feeling from the cold looks of these lords that he could no longer command alone. But they pretended to be ill at home, and it has not been possible for the said lady to assemble them at all since she has been in town. And moreover, as the Earl of Leicester has been drawn into this party, he was also provided with a slight cold, which served him for an excuse not to meet the council at the appointed hours. Whereupon on Ash Wednesday, having come purposely into the chamber of the said lady, a little before supper, where the said Cecil was, and having found the Duke of Norfolk at his post, who was chief of them all, he was well pleased that the said lady, in the presence of the said Cecil, began to discourse about her affairs, and to complain that none of those lords would meet in council to deliberate as to what should be done. To the which, after having with great humility and respect, prayed humbly that the said lady would excuse him, if, for the duty and infinite obligation which he owed to her service, he said to her, as a knight of worth and honour, that the best and principal part of her subjects saw things so ill conducted, and in a way so contrary to their desire, that he feared if her realm should incur some danger, the said Cecil must bear the blame of everything that had passed before to-day. At this remark, the said Cecil being greatly troubled, and the said lady moved, she went into a great passion against the earl, at which the Duke, who stood rather distant, speaking tolerably loudly to the Marquis of Northampton, who was not as yet of this party, said, "You see, my lord, how the Earl of Leicester, so long as he followed and approved the opinions of the secretary, was favoured and welcomed by the queen, and now, because he would virtuously show his good reasons against those of the others, she looks black upon him [*lui faict ung tres mauvais visaige*], and is willing to send him to the Tower. No, no, he shall not go there alone." The said Northampton replied, "I bless God that you, who are the chief subject in this kingdom, are at length determined to show your virtue: in this I am ready to follow and aid you in all that may be possible, for I am also here to complain." And thus, the greater part of these nobles, have gained a hearing, and are united; whereupon, on the proposal of these important points above mentioned, they have required that the said Cecil should show in what state affairs were, and how they had been conducted for eight years past, for they did not choose to deliberate upon a foundation of lies, as until now the said Cecil had dissembled in the things he proposed to the council. And Cecil has since sought reconcilement with these lords, especially with the Earl of Leicester, remonstrating that he, at least, ought not to have joined the others, above all, when they demanded account of the state of affairs for the last eight years, for he had been yet more concerned in them than himself. To this he replied, that it was he alone (Cecil) who should give account for the faults of both, since he had never done aught but by the counsel and advice of the said Cecil, who indeed ought to look to his interest, for he had already provided for his own.

The foregoing account was not improbably given to De la Mothe by Throckmorton, and this will account for the high tone in which the confederate nobles are represented, very improbably, as having spoken. The power of the secretary, and the attachment of his royal mistress, are however very strongly marked. But although Cecil had in this instance triumphed, he was considered too important an agent to be suffered to remain unmolested; and only five days after the date of the last dispatch a memoir to the queen-mother, "under promise that she will speak of it to no person in the world," appears, giving an account of a new plot which had been formed:—

The Signor Robert Ridolfi having received charge and command personally from the Pope, to treat for the re-establishment of the Catholic religion in England with the Catholic lords of the country, he addressed himself principally to the Earl of Arundel and to Lord Lumley, with whom formerly he had had dealings respecting certain sums which he had lent them: this had given him great facilities for treating with them, without suspicion, and he found them well disposed to his wishes, but not sufficiently bold to dare to undertake anything, unless the Duke of Norfolk would join their party. This was very difficult, but at length, being persuaded, he took the matter to heart, and does at this moment more so than the two others. And on account of the great stake he has in the kingdom, the Earls of Derby, of Shrewsbury, of Pembroke, and of Northumberland, and many others, who are not settled in the new

faith, have shown, as soon as he caused it to be known, that they would be ready to follow him. But, as they would not displease their queen, whom they honour and revere greatly, and not to carry this affair to arms and bloodshed, thay have judged that, previous to any manifestation in favour of the Catholic religion, it was necessary to withdraw from the hands of the secretary, Cecil, and those of his party who are quite devoted [*toutz passionez*] to the new religion, that management of the state, which they have had ever since the accession of this queen to the throne, to the end that having it in their hands, they may afterward easily manage the affair of the Catholic religion.

He then goes on to state, that they were about to tamper with Leicester, and that he, the ambassador, would afford them all the aid in his power. This account is very important, inasmuch as it proves that the intrigues of the Duke of Norfolk, which have hitherto been considered as originating with Maitland, had in reality a foreign source; and also that the arrangement for his marriage with the Queen of Scots was only one part of a deeply laid scheme for overturning the government and religion of the land. The reader will observe, too, that in De la Mothe's dispatches Leicester appears in all his characteristic duplicity. In every plot Leicester is mentioned either as being involved, or at least favourable to it; and the reader will remember that to him Elizabeth owed the discovery of the Duke of Norfolk's treason. Meanwhile the Huguenots seem to have openly recruited for troops in England, and the ambassador, with some surprise, remarks, that—

> The young Earl of Oxford has shown himself for some days ready with a number of young gentlemen to set out to the Prince de Condé or some German prince, though he has not obtained permission of the said lady. It appears that some have counselled him to go of his own accord, and have assured him that he would not incur the anger of the queen by so doing; but at length she has expressly forbidden him, and has given him letters to go into Ireland. I do not know whether some contrary wind may not after all drive him, according to his wishes, towards Rochelle.

Soon after, the news of the Battle of Jarnac and the death of Condé arrived in England, and caused great anxiety. The Sieur de Montafie was sent over from France expressly to notify this victory to Elizabeth; according to De la Mothe her answer was rather different to that which Cecil has recorded, but still, as the reader will see, the same in effect:—

> She replied, that she could not, in truth, rejoice at the death of one who was your relation and so near in blood as the late Mons. the Prince de Condé, unless that he had had some evil intent against your most Christian majesties and your realm, in which case, if he had cherished the least spark in the world of it in his heart she should have praised and thanked God heartily for his judgments; but that she should act greatly against her own conscience if she had suspected him of aught, for she always had firmly believed that as he had the honour to belong to you, so he was also your very good and very faithful subject and servant, and she could not but be much vexed at the continuation of the troubles in your kingdom.

These papers are so important and interesting, that, rather than abridge our abstract, we will defer the remainder till next week.

The City of the Czar, a Visit to St. Petersburgh in the Winter of 1829-30. By Thomas Raikes, Esq. Bentley.

Recollections of a Tour in the North of Europe in 1836-37. By the Marquis of Londonderry. 2 vols. Bentley.

Steam, a strong and active spirit,—*the* schoolmaster of the nineteenth century,—is at this moment straining every nerve, or rather every valve, to induce the good people of England to visit more familiarly and frequently than they have been accustomed, their allies and connexions on the shores of the Baltic. Russia, we confess, holds out strong temptations to a shrewd, active, intelligent, searching traveller; for little is really known of the interior of that vast and predominant empire, of the condition and feelings of the people. Of St. Petersburgh and Moscow, indeed, we have had enough; and, if we may judge from the works before us, not much remains to be told. At the former city, we hear, as of old, of the gorgeous palaces,—the superb ceremonials of a Court, which, Lord Londonderry informs us, dresses itself four times a day;—we are favoured with the customary reminiscences of the political wisdom and personal luxury of that modern Semiramis, Catherine;—we find traces everywhere of that half boor and half philosopher Peter the Great;—and anecdotes of the insane ukases of Paul, so graphically described by Dr. Clarke. At the latter, the talk is of the Kremlin, with its domes and bells, and of the conflagration in Napoleon's time. In both towns we encounter endless notices of the army, the appointments and honours of which monopolize all the thoughts and distinctions in the gift of the Emperor;—on the road between them, a few words describe to us a swarm of serfs—faithful, gentle, and enduring, degraded in intellect, yet not ungifted with such quickness of eye and hand as makes them good carvers in wood and fine workers in metal, or with a natural capacity for music, that sister of the imitative arts. We are told of scenery offering few noticeable features, of a climate whose ferocious severity affords compensating and characteristic enjoyments to a people "cradled in Hyperborean frost." But all these well-known matters are set before us baldly, with little either of speculation or philosophy to illustrate or enliven the catalogue of facts and features. One of the narrators, indeed, went forth in nearly as much state as Adonijah, the son of Haggith,—"with a coach and six, a britska and four, and a *calèche*, containing the cook and the courier;" and thus hemmed in by conventional associations and home luxuries, could have few opportunities of observing or disposition to note the minor features of morals or manners, the tendencies manifest or dormant among the people. Two pages of such notes, it is needless to add, would outweigh in value a volume concerning the Winter Palace, now no more, or the hundredth sketch, be it ever so well done, of Falconet's equestrian statue.

The ground taken by both tourists is the same; the Marquis, as was natural, is the more eloquent concerning receptions, fêtes, diplomatic dinners, balls at the Anishkoff Palace, the brocade and gold tissue which environ the sovereign of Siberia: Mr. Raikes telling us most of the manners and usages of the middle class;—one custom mentioned is new to us:—

> "There is a great and singular prejudice in this country against mourning: the mournings of the court being indispensable, are unusually short and often deferred till two or three deaths have occurred, and can be included in one order; but those of individuals are often evaded; and there are certain fête days in families at which no one would commit the indiscretion of appearing in a black coat."

The latter part of Lord Londonderry's first volume contains details of the different military schools and establishments through which he was conducted. But as Russia is the land, *par excellence*, where the slightest movements of courtesy have a meaning and an object—where not even a Princess

> Drinks her tea without a stratagem—

whence no "extraordinary" Count can come forth without concerning himself with the *cancans* of aristocratic society as well as the mysteries of cabinets,—and as the political bias of the gallant Marquis was as well known to his imperial host as it is to the public of England, we may therefore be excused for not concerning ourselves with the information thus collected:—enough to note, that the perfections of the said schools lie in wholesome food, neat dormitories, strict discipline, and other such matters. A laughable proof of the importance given to the army in Russia manifested itself at one of the military *fêtes* at which Lord Londonderry was present:

> "In the interior of the *salle blanche*, on each side of the door, were placed two of the finest grenadiers of the regiment, measuring at least six feet two or three inches. When we had passed these in the outer hall, to our amazement we beheld the two little Grand Dukes standing as sentinels, and dressed with minute exactness as privates of the regiment, with their knapsacks, great coats, haversacks, all in marching order. To the inexpressible amusement of every body, the Emperor himself then put the little princes through the manual and plafoon exercise, which they both did incomparably."

Nicholas, however, appears to love a drill,—whether of his myriad "children" (for with this homely and endearing title the Czars, as a matter of form, address their soldiers at reviews), or of his smaller legitimate family (the two little Archdukes aforesaid, or of a gentler corps—the *corps de ballet*. Lord Londonderry cites, as a proof of the comprehensiveness of the cares of Nicholas, the fact, that when the 'Revolt of the Seraglio' was in preparation, "where a number of females are drilled and manœuvred on the stage, so anxious was the Emperor that this should be done in the greatest perfection, that his Imperial Majesty and the Grand Duke Michael condescended to attend the rehearsals, and to give instructions on the subject."

What nuts for the *Charivari!*

But the best thing that we can do, by way of exhibiting the Marquis as a describer of what he has witnessed, will be to extract from his pages an account of the strangely barbaric "blessing of the waters." The reader will perceive that the noble author has an eye for colour and costume:

> "The 6th of January, old style, is the day set apart throughout the empire for blessing the waters. In every city and place in Russia, this solemn religious ceremony takes place on this day. I repaired by invitation to the palace at eleven, and was placed, as before, among the aides-de-camp généraux of the Emperor. * * The troops of the regiments of the guards in garrison at St. Petersburgh were formed pretty much in the same manner as they were on New Year's day. They lined the saloons of the Palais d'Hiver, and the officers assembled, as before, in *la salle blanche*. At eleven the Emperor, accompanied by Prince Charles of Prussia and the Héritier, arrived, and the column of procession was formed to the palace chapel, where high mass was performed. On this occasion (the only one in the year) the Archbishop or Metropolitan performs the service himself, and it is done with all due pomp and solemnity. The high priests and clergy assisting were clothed in more costly robes than on any former occasion. The Metropolitan, who is a man of small stature, seemed buried under the weight of his garments of gold, and of his cap, in which every jewel of the East seemed to be concentrated. The Emperor and Prince Charles stood together near the altar, the Grand Duke behind them; and all others present formed a circle around them. No ladies were present. The mass being ended, and the *Te Deum* chanted, the great banners of the chapel were taken up by the attending clergy, to be borne out upon the waters, together with the sacred cups, books, and the symbol of the host, which were lifted up and carried by the priests. The young boys of the corps of choristers next struck up a hymn of praise, and formed three abreast, followed by the gentlemen singers in like order. They marched through the whole of the rooms of the palace to the great stair-case leading to the Neva. After the above, appeared all the sacred emblems borne by the priests, two and two, of whom more than three hundred filed off, carrying these offerings and rich religious relics. Their rear was closed by the Metropolitan himself, with train-bearers,

&c. After the head dignitary of the church, the Emperor came in Cossack dress, with his head bare; behind him followed his aides-de-camp généraux, and all the civil and military officers of the empire in the capital. On coming to the grand door of the palace, the cold was near twenty-eight degrees, and the snow was falling in thick masses; the atmosphere was dense and foggy, and yet, notwithstanding all this inclemency of weather, countless multitudes appeared on the quay, on the banks, and on the waters of the Neva. The Emperor stopped on the stair-case, and ordered Prince Charles of Prussia and the Grand Duke not to go out of doors and expose themselves to the tremendous weather that was raging. They obeyed his Imperial Majesty's orders. He was kind enough to address me in a similar strain. I replied that his Imperial Majesty had been so obliging as to place me among his aides-de-camp généraux, and I trusted he would allow me to attend his person as they did. We left the palace, and walked in solemn procession, amongst the mass of the inhabitants of St. Petersburgh, without cloaks, and bareheaded, in splendid uniforms and diamond decorations, in cordons of all colours, and in uniforms of all classes and descriptions, in one of the most pitiless snow storms that ever descended from the heavens, along the terrace and quays of the Neva, for a considerable distance, until we were opposite the windows of the Empress, where her Imperial Majesty and her ladies were assembled. We then turned to the Neva, and proceeded on the ice to a temple which was erected on the river. The clergy and the head of the *cortège* assembled around and within it. A loud mass was then sung; at its conclusion the Metropolitan, taking off his upper garments and seizing a large basin and tankard, descended a staircase leading from the inside of the temple to the water, a large hole having been made in the ice under the temple. His eminence shortly appeared from below, having blessed the waters; and bearing them in the jug and salver, he proceeded to the Emperor, who plunged his face and hands into the vessel; then the grand priest, dipping a brush into the water, sprinkled his Imperial Majesty all over, invoking at the same time the blessing of Heaven on Russia and its monarch. The Metropolitan next proceeded to sprinkle and give his benediction to all the standards and colours which had been collected round the temple, and afterwards to the officers, civil and military, who were besprinkled in a similar manner. During this period salutes of artillery from the fortress continued to be discharged, but the multitude remained in breathless awe and silence. One of the officiating clergy had been despatched, so soon as the Metropolitan had blessed the waters of the Neva, to the Empress within the palace, bearing vessels and goblets for her Imperial Majesty and the ladies, filled with the holy water; and when the procession resumed its way back to the palace, the whole populace rushed to the temple to drink or to touch the waters. It is difficult to account for the extreme superstition which pervades the lower class of Russians, even to this day, in regard to this ceremony. Children that are born on the night preceding this consecration, are sent with their nurses and plunged into this hole under the ice, and it is believed, if they endure it, (which many do not,) that they will be free from everg danger through life. The little ones occasionally perish from the effects of this experiment, and in some instances the frozen hands of those who plunge them under the waters are not able to hold them, when slipping from their grasp they perish, and are immediately considered as angels on high. * *

"In this ceremony of blessing the waters at the pavilion on the Neva, the children carry thick birch brushes and bundles of clean linen, and the effect of seeing them all flocking and running to the ceremony, urged on by superstition such as this, is very remarkable. The Emperor, cold and wet to the skin, with all the *cortège* covered with snow, and entirely drenched, in all their splendid ribbons, stars, &c., now returned to the palace, the troops and procession falling in as at first, the standards and colours being carried back to the centre of their corps. After a general salute, the clergy, priests, and choristers disappeared with their symbols and emblems into the sacristy behind the altar; the troops of the guards filed off before the Emperor and Prince Charles. His Imperial Majesty next went to the apartments of the Empress, where a *déjeûner à la fourchette* was provided."

Lord Londonderry returned home through Poland, and assures us that the worst enemies of that unhappy country are the unfortunate patriots who sacrificed everything in the hope of upholding its independence, and are now suffering for their zeal in poverty and exile. He met, he says, several enlightened men who agreed with him in this opinion, though "there were others who were not to be convinced." Indeed! it is a proof then that these "others" are pretty numerous, and not confined to a class, for his lordship was not in a position to collect honest opinions; he travelled, as he himself tells us, "as no one, not clothed with an official station, and not a crowned head," ever travelled before. "On arrival at every fixed station, I found that the Emperor had graciously sent orders for all the authorities civil and military to receive us with the utmost distinction; and quarters were provided for us everywhere, either at public offices or private houses. To my great distress, arriving often at a station at four or five in the morning in the bleakest weather, I was forced to witness, on turning out of my wagon, officers *en grande tenue*, civilians in silk stockings, and troops presenting arms." Again: "On approaching Warsaw, we were met by orderly officers and a squadron of hussars, who were sent by the governor marshal, Prince Paskewitch, to escort us to the Palais Bruhl, which the Emperor had ordered to be prepared for our reception. We found ready a complete establishment of servants, a large saloon brilliantly illuminated, a great dinner prepared, although we arrived at four in the morning, and various officers on service awaiting our approach.—During the whole time we remained at Warsaw, we were treated with the same ceremony and respect. We lived entirely at the Emperor's expense, both as to a sumptuous table and as to equipages and servants; and no consideration would induce the attendants to take the smallest remuneration for all that we had received at their hands." This was pleasant enough, we admit, but the surrounding circumstances were not such as would best enable a traveller to collect opinions as to the state of the country, or of the "Emperor's gracious intentions and benevolent wishes" as manifested by his actions.

In a somewhat voluminous appendix the noble lord has collected together a good deal of information relating to Odessa and its trade—the Crimea—the Caucasian provinces—the fisheries on the Black Sea—metallurgical researches in the Oural Mountains—recent discoveries in Nova Zembla, &c., subjects on which the English public are already well informed, as his lordship would have known had he been an attentive and habitual reader of the *Athenæum*.

Colonization and Christianity. By William Howitt. Longman & Co.

The innate propensity observable in mankind, of the strong to prey upon the weak, is apparently as old as the origin of evil, and cannot be expected to be eradicated at the present day by the superficial caustic of homilies and sermons. Those who found their judgments on the theory of moral obligations are no doubt justified in saying, that it is unnatural for the white man to enslave the black. On the other hand, if the science of human nature be one founded on facts, it must be admitted that the tyranny of the strong is founded on a prescription ascending almost to the beginning of nature. Such injustice is certainly to be much deplored; in this as in many other instances our natural impulses stand in need of correction; but a vice so deeply inherent in the children of Adam, will hardly yield to the voice of modern prophecy. Enlightened reason may—hot invective never can render mankind more equitable and humane. Ready, therefore, as we are to acknowledge the benevolent intentions of Mr. Howitt, we cannot bring ourselves to admire the volume now before us, the passionate and declamatory style of which is well calculated to inflame the minds of such as are already disposed to entertain his views, and will as surely increase the virulence of those who hold antagonistic opinions; while the calm impartial reader who wishes to arrive at sound practical principles in a matter of some difficulty, will be apt to revolt at the exhibition of so much one-sided vehemence. Our author says in his preface, "The whole wide field of unchristian operations in which this country, more than any other, is engaged, has never yet been laid in a clear and comprehensive view before the public mind. It is no part of the present volume to suggest particular plans of remedy. The first business is to make known the nature and the extent of the evil,—that once perceived, in this great country there will not want either heads to plan or hands to accomplish all that is due to the rights of others, or the honour and interest of England."

To write a volume on glaring political crimes, or on "a system which has been in full operation for more than three hundred years, and continues yet in unabating activity of evil," without suggesting any particular plans of remedy, is like abandoning the rational and useful for the sake of pursuing the popular alone. But has this system of crime been in operation only during the last three hundred years? Mr. Howitt, indeed, sometimes represents it to be coeval with Christianity: but when we call to mind the slavery of the Israelites, and the curse pronounced on the children of Canaan, we think we can trace it to a remote period, when the stream of humanity had as yet flowed but a little way from its limpid sources.

We deny altogether that Mr. Howitt makes known the nature of the evil; he never even seriously sets about such a common sense inquiry. He avers that the persecution of the aboriginal inhabitants of the New World had its origin in popery: and the unchristian operations, "in which this country more than any other is engaged," are ascribed by him to the lamentable fact, that protestantism retains too much of the savour of popery. Such is his philosophy; and his ideas respecting the cure of the evil appear to us to be quite as ill defined, as those of its origin are hasty and ill weighed. He says, "The barbarities and desperate outrages of the so called Christian race, throughout every region of the world, and upon every people that they have been able to subdue, are not to be paralleled by those of any other race, however fierce, however untaught, and however reckless of mercy and of shame, in any age of the earth. Is it fit that this horrible blending of the names of Christianity and outrage should continue? Yet it does continue, and must continue, till the genuine spirit of Christianity in this kingdom shall arouse itself, and determine that these villanies shall cease, or they who perpetrate them shall be stripped of the honoured name of Christian!"

If from the commencement of Christianity down to the present day, there has been, as our author asserts, no cessation of crime, then the profession of Christianity obviously offers no protection to the weak. He exposes at great length the atrocities perpetrated in the name of Christianity, yet proposes no remedy but the same name. True, he says that Christianity has been and still is misunderstood: yet he is unable to advance anything which can make the multitude understand it as he does. We regret the inconsiderate zeal which incited Mr. Howitt to exhibit Christianity in so disparaging a light, for if it be

true that Christian nations are and always have been particularly barbarous, may not the infidel reproach our creed for our inhumanity? Nor do we think that he is likely to teach mankind a new system of colonization, simply by invoking the name of Christianity. In fact, the whole history of mankind shows how inexpedient and injudicious it is to attempt to set up a religious profession as a beacon for our moral guidance. In the business of life, in the midst of conflicting rights and interests, it is not always easy to discover the path of duty; at all events, the inquiry after it is often attended with a great deal more of doubt and difficulty than is compatible with the secure tenure of faith. Morality and faith, therefore, cleave asunder from necessity; and while the latter reposes, the former is easily swayed by interests and passions. We cannot bestow further space on a volume which explains so imperfectly the nature of the evils of which it treats, and is almost silent with respect to a remedy for them.

Letters on Paraguay; comprising an Account of a Four Years' Residence in that Republic, under the Government of the Dictator Francia. By J. P. & W. P. Robertson. 2 vols. Murray.

These are two very pleasant volumes; but, to prevent misapprehension, we think it well to state at once, that they *conclude* with the election of Francia to the Dictatorship; and that the history of his government is reserved for a third and forthcoming volume. Thus much premised, we have nothing further to say in the way of objection, for more agreeable travelling companions we have not lately met with than the Messrs. Robertson.

In 1811, the elder brother, being then at Buenos Ayres, freighted a vessel, and resolved to send her up the Paraná to Assumption, on a trading speculation. This magnificent river is, it appears, navigable for 1500 miles, by vessels drawing ten feet water. As, however, the passage has to be made against a stream which runs at the rate of three miles an hour, and the distance on horseback could be performed in fifteen or sixteen days, Mr. Robertson decided to proceed personally by land. But the nature and character of the voyage may be understood from the account of a subsequent attempt made by the brother. Having departed from Santa Fé, he observes,—

"The wind during the night began to abate, and by ten o'clock next morning it was scarcely sufficient to enable us to stem the current. The dark and louring sky gave evidence of a coming storm. The thunder rolling heavily at first in the distance, became louder and more distinct; and the lightning, which began by casting its faint reflections on the far horizon, illuminated by degrees the masses of clouds which hung heavily above us and around us. At length, the whole fury of the storm broke suddenly over our heads. One great gleam of lightning, accompanied, not followed, by a clap of thunder loud enough to waken the dead, made us all start; and these were instantly followed by a hurricane so terrific, that ere we could take shelter against it, or prepare for it, every stitch of canvass we had set was blown to atoms. Our ship was hurried up against an island, our bowsprit tearing and crashing the boughs of trees which opposed its progress. Now the lightning was almost one continued flash, and the thunder rolled and cracked and pealed about us in a way to astonish even the Paraguayan crew and passengers, though so much accustomed to tropical storms of this kind. * *

"The storm subsided, but our sails had been blown to tatters; and, no such visitation as a hurricane having been anticipated, there was on board of 'Nuestra Señora del Carmen,' no spare sails. What were we to do? the remnants which had been blown hither and thither about the island were carefully collected; and, setting all his men to work, on these 'shreds and patches,' the patròn contrived to remake a small main-sail and a top-sail. With these we were to make our way against 800 miles of current, three knots per hour strong. This canvass, with a good breeze, and *without* a current, might have carried us at the rate of five knots; deducting therefore three for the current, we had the comfortable prospect, with a fair wind, of making a progress of two miles per hour. With a *fair* wind—that was the rub. We were to advance two miles an hour with a fair wind; but where were the fair winds to be had? The prevailing ones were from the north; those from the south, which we wanted, were few and far between: so that the patròn answered our regrets about the sails by saying, if we would give him fair winds, we should not have cause to complain of his want of canvass. * *

"When the weather was calm, our peons betook themselves to our two canoes, and warped our vessel up in this way. One canoe went a-head first, with a coil of rope, which was let out as the canoe advanced; and the end of this rope being made fast to a tree, the vessel was hauled up. Meantime the second canoe went a-head from the tree, and made fast another coil; so that the two canoes, working alternately, kept the vessel always on the move. By this operation we sometimes made six miles in a day, never more; and when the north wind was strong, even the warping was laid aside, and we were tied to a tree. Sometimes, too, we had a wide crossing to make, over which our warping tackle would not reach, and then again we were—tied to a tree. We were thus 'tied up' sometimes for eight days together: then would come the long-looked-for south wind; and after we had enjoyed it perhaps for a day,—sometimes only for a few hours,—our dreams of advancement were put an end to by a *barradura*, or getting on a sand-bank. * * The most provoking of all our detentions were those caused by windings of the river. These were so completely circular at some places, that a fair wind at one part of them becomes quite a foul one at another. Then we must warp; then the warping is a slow, a very slow, operation; then before we get round to the right point, the wind has shifted to the wrong point, and then—we tie to a tree."

After thirty-two days they had only accomplished seventy-two leagues, being on an average about *two leagues and a half* a day. What a river for steam navigation, and what a country would it open!

"The Paraná is one continued line of beautiful scenery from its source to its mouth. From Santa Fé to Corrientes, the part of it which at this time I traversed, the most striking feature of that scenery is decidedly the *islands* of the river. They are really innumerable. During the whole of our voyage, I cannot recollect one place where we had the Gran Chaco on one side, and Entrerios or Corrientes on the other, with a clear stream between. All the way up we found islands of every form and size interposing themselves between the two river borders. There is not only a succession of these islands, but they lie abreast of each other; some in long narrow strips, running parallel with two or three others of smaller dimensions, and some commencing opposite the middle of a succeeding island, and terminating opposite the centre of another. Thus we were always hemmed in by an endless and intricate chain of islands and islets; the channel sometimes finding its devious way through their windings, sometimes going to the west, and anon returning to the east side of the river. The islands are diversified, verdant, umbrageous, beautiful. The trees on them are generally small, but almost all evergreens; the flowering shrubs and wild flowers luxuriate in every corner; while the endless variety of creepers, or more properly of climbers, ascending to the tops of the larger trees, and thence gracefully throwing out their flowers, which remain pendent in the air, contribute greatly to the beauty of their water-girt abodes. I found many varieties, also, of the air-plant, at once the most delicate and fragrant of the floral tribe."

Yet such has been the effect of misgovernment, that though this fine country was for three hundred years in the quiet possession of Spain, the traveller may journey whole days together, and see only a few miserable mud huts. Let us hear how much more favourable is the report Mr. J. P. Robertson makes of his land explorations. After a journey of 340 miles from Buenos Ayres to Santa Fé, he thus sums up his observations:—

"After I left Luxan, I saw two miserable villages, called Areco and Arrecife; I saw three small towns, called San Pedro, San Nicolas, and the Rosario, containing each from 500 to 800 inhabitants; I saw one convent called San Lorenzo, containing about twenty monks; and I saw also the post-house huts. I saw thistles higher than the horse, with the rider on his back; here and there a few clumps of the Algarroba tree; long grass; innumerable herds of cattle, wild and tame; deer and ostriches bounding over the plain; bearded biscachas (a sort of rabbit) coming out at evening by groups from their thousand burrows which intersect the country: now the whirring partridge flying from under my horse's feet, and anon the little mailed armadillo making haste to get out of the way. Every now and then I came within sight of the splendid Paraná. The town of Rosario is situated on a high precipitous bank which overlooks the river. But its broad, pellucid surface was undisturbed by any bark: its magnificent waters glided down in all the majesty, but all the seclusion of Nature. I saw a stream two miles broad, and ten feet deep at the place from which I surveyed it; and that place was 180 miles from the mouth of the Plate, and 2000 from its source. There was no cataract to impede navigation; no savages sought to interrupt traffic, or required to be driven from the banks. The land on both sides was as fertile as nature could make it; and offered the impediment of neither wood nor stones to the plough. The climate was most salubrious. Yet all was still as the grave."

This gentleman, to whose personal narrative we shall now confine ourselves, arrived at Santa Fé just after the siesta-hours, which, during the heat of the summer, commence at one and last till five:—

"A very primitive scene presented itself to my view, as, followed by my postillion and servant, on our jaded horses, and in our dusty travelling habiliments, I rode through the narrow streets of the town. Let me premise that the doors of the houses open generally at once from the principal apartment or the habitation upon the street; and where it is not so, a short, but wide passage, entered by a gateway, leads to the quadrangle, on every side of which the rooms are ranged. Each chamber has generally a door opening into this quadrangle, or patio. Every gate, every door in every patio, every outlet from every room into the street, was thrown open; and the inhabitants, male and female, in all the luxury of dishabille, were seated at the entrances of their respective dwellings. Those who were on the shady side of the street, sat literally *in* the street; while those from whose houses the rays of the sun had not yet departed, sat within their porch to enjoy the shade. But all were perfectly exposed to public view. The gentlemen were dressed simply in a shirt, and pair of white trousers, with their feet in slippers; while the ladies, on principles of like deference to coolness and comfort, rejoiced in a primitive chemise, a lower vestment, and some loose and transparent upper garment, scarcely at all confining the body. —How do you think the natives were employed, as in the way described, each man, woman, and child sat in the portals, or lounged at the doors, of their houses? Why, they were either smoking cigars, sipping maté (the Paraguay tea) through a tube, or eating water-melons. Some of them were engaged alternately in all three operations. The streets were strewed with the rinds of their favourite fruit, while the air was redolent of their not less favourite tobacco."

Having letters of introduction to a Mr. Aldao he proceeded direct to his house, and found the family, after the established fashion, seated in the porch over their water-melons, maté, and cigars.

"No sooner did Señor Aldao read the contents of my introductory passport, than the whole family rose from their seats, and welcomed me. The slaves were called out; the horses were unsaddled; I was ushered into a room much too spacious for the furniture in it; and I was told it was my bed-room. Here, spirits, wine, biscuits, pannles, fruit, and cigars, were

spread out before me; a large silver basin and ewer, with very cool and clear water for ablution, were brought me, while I drank of the same refreshing beverage from an old-fashioned silver tankard. A massive silver maté-cup also graced the table; and the stretcher, or little bedstead, on which my mattress was laid, was graced with sheets like cambric, pillow-cases of fine embroidered lawn, and a crimson damask counterpane. But it could boast of no curtains, neither had the bed-room any wash-hand-stand, but, in lieu of it, a leather-bottomed chair of most antique appearance. There stood by me a tall negress with a napkin depending over her arm, in double folds to the ground. At each extremity it was richly embroidered, and terminated by a deep fringe of the finest lace. The body of the towel (for such lowly office was the splendid napkin intended to perform) was like a thin India crape; and when I asked my attendant where it had been made, she said 'in Paraguay.' Having regaled and refreshed myself, I sent my automaton towel-rack out of the room, and, changing my traveller's garb, I sallied forth to inspect a little more closely the family of Don Luis Aldao."

The family party, now increased by many friends and neighbours, were preparing for a bath in the river.

"Don Luis asked me to accompany them; and though it was certainly new to me, and seemed not a little odd, that I should be invited, with others of my own sex, to accompany the ladies to their bath, I never doubted we were to part company at the water's edge. I of course consented to become one of so novel and interesting a party; and forth we sallied. The ladies were attended by a great many female slaves, bearing their mistresses' wearing apparel. As we moved onward, *en masse*, many was the joke, and loud the laugh, which cheered us on our way.—At length the shining river arose upon our view, its waters rippling and dimpling under the dancing beams of the moon. But guess, if you can, my astonishment, when, on reaching the banks, I saw the Santa Fecina Naiads, who had taken to the stream before our arrival, bandying their jokes in high glee with the gentlemen who were bathing a little way above them. It is true they were all dressed, the ladies in white robes, and the gentlemen in white drawers;—but there was in the exhibition something that ran rather counter to my preconceived notions of propriety and decorum. As I stood by, I saw the whole inhabitants of Santa Fé (for I suppose scarcely one was left in the houses) carry on their aquatic gambols as familiarly as if they had been whirling through the mazes of a quadrille. Merry-making, revelry, and laughter were the order of the evening; and yet, from all I heard and saw, during much subsequent intercourse with this people, I verily believe that their bathing diversions were quite as innocent as a rigid Mussulman would think our European ball-room scenes to be. An over-rigid judgment passed by a foreigner on the inhabitants of Santa Fé, because of their mode of bathing, would be as unjustifiable, and as erroneous, as that of the Mahometan censor on the women of England, France, and America, because, like those in his country, they are not cooped up in the harem. At length our party emerged from the water. The ladies were dressed with great dexterity by their maids; the wet bathing-clothes were collected; the hair, the long, beautiful tresses of black hair, which had been kept up with a comb before the bath was taken, now floated in luxuriant abundance over the shoulders, and much under the waists of the Santa Fecinas, as in slow procession they returned to their respective homes. They were careful not to walk too fast, that they might not lose the benefit of their refreshing dip; and when, on arrival at home, they assembled, in tertulia, at their porches, or in their patios, the hair, like a veil, continued to shroud almost every part of them but their face. They alleged that they could no otherwise have their tresses and ringlets dried before the hour of rest."

Here he was introduced to Señor Don Francisco Candioti. This man is the presiding genius of the place, and its prosperity is mainly owing to his enterprise and industry. From small beginnings, he is now "lord of three hundred square leagues of territory, owner of two hundred and fifty thousand head of horned cattle, master of three hundred thousand horses and mules, and of more than half a million of dollars, laid up in coffers, in ounces of gold imported from Peru." Having in his youth visited that country with a few mules for sale, he saw at once how insufficient was the supply, and how beneficial a trade might be carried on by rearing these animals for the Peruvian market. On his return, he invested his little property in the purchase of stock,—the lands were then *given in* to the purchaser of the stock on them, although horned cattle sold at 2*s*., and horses at 6*d*. a-head. From that time forward he conducted his annual troops and droves to Peru, re-investing the proceeds in further purchases, and thus became the wealthy man here described. The picture of him, in the barbaric sumptuousness of man and horse, is worthy of a Spanish pencil.

"Just returned from one of his excursions into that country, there he sat, on a sleek and powerful bay gelding, the finest animal, decidedly, I had seen in the country. Anything half so splendid as horse and rider, taken together, and with reference to the Gaucho style of equipment in vogue, was certainly not to be found in South America. When the family congratulations on meeting, after a six months' absence, were over, I was introduced to Señor Candioti, and made my bow with all the deference due to so patriarchal a potentate. His manners and habits were alike primitive; and his mode of carrying himself towards others was as unostentatious and courteous, as were his claims to superiority in wealth and station universally admitted. * * He continued sitting on his horse, and kept up a familiar chit-chat with all around. Every now and then he lighted his cigar by striking fire with a flint and steel on tinder kept in a polished tip of horn, which was embossed with silver, and had a gold chain attached to it, by which the lid, or rather extinguisher, depended, while the horn was in use. As I looked at him I could not but admire his singularly-handsome face and dignified mien.—Then, for his attire, according to the style and fashion of the country, it was magnificent. His poncho had been made in Peru, and, besides being of the richest material, was embroidered on a white ground in superb style. Beneath it he wore a jacket of the finest India cloth, covering a white satin waistcoat, which, like his poncho, was beautifully embroidered, and adorned with small gold buttons, each depending from a little link of chain of the same metal. He had no cravat, and the collar and front of his shirt displayed, upon fine French cambric, the richest specimens of tambouring which could be furnished in Paraguay. His lower vestment was of black velvet, open at the knees, and, like the waistcoat, adorned with gold buttons, depending also from little links of chain, evidently never intended for connexion with the button-holes. From under this part of his dress were to be seen the fringed and tamboured extremities of a pair of drawers, made of the fine Paraguay cloth. They were ample as a Turkoman's trousers; white as the driven snow, and hung down to the calf of the leg, just far enough to show under them a pair of brown stockings, manufactured in Peru from the best Vicuña wool. The potro boots of Señor Candioti fitted his feet and ankles, as a French glove fits the hand, and the tops of them were turned over, so as to give them the air of buskins. To these boots were attached a pair of unwieldy silver spurs, brightly polished. To complete his personal attire, the princely Gaucho wore a large Peruvian straw hat, with a black velvet band around it, while his waist was girded with a rich crimson sash of silk, serving the treble purpose of riding-belt, braces, and girdle for a huge knife in a morocco sheath, from which protruded a massive silver handle. Gorgeous as was the apparel of the rider, it was, if possible, outdone by the caparison of his horse. Here all was silver, elaborately wrought and curiously inlaid. The peaks of the saddle, and the complicated head-piece of the bridle, were covered with the precious metal; the reins were embossed with it; and in the manufacture of the stirrups there must have been exhausted all the ingenuity of the best Peruvian silversmith, with at least ten pounds of plata piña (or virgin silver) to work upon. Such, in character and person, was Candioti, the patriarch of Santa Fé."

The country now becomes undulating and wooded, the herds more extensive, the cattle finer, and the peasantry more athletic. Letters from Candioti secured to Mr. Robertson a welcome reception at his estancias, and at one of these we purpose to introduce the reader to a hearty supper, and a new method of catching partridges.

"Many were the victims destined to furnish the supper, which Candioti's son now gave orders to prepare. The fatted calf was killed to supply carne con cuero; down from the perch were brought three pullets, for the olla and the spit; three brace of just-fledged doves were devoted to the stew-pan; a bleating lamb was bound to the stake;—'And now,' said the son of Candioti, 'vamos á agarrar unas perdrices,'—'let us go, and catch some partridges.' You have heard of partridges being *shot*, but how they are *caught* in those countries, you are perhaps not aware. We walked about five hundred yards from the house, followed by two Gauchos on horseback. Each of them had in his hand a small whip. Presently we saw scores of partridges, just peeping with their small heads above the grass. The Gauchos rode towards the first two they observed, and leaning half way down the sides of their horses, commenced by describing a pretty large circle around the birds; while these, with anxious eye, followed the movement. Gradually the magic circle was lessened, and the enchanted partridges became more and more afraid of trying to make their escape from it. They became stupified, and the peons closing in with them, by a sudden and dexterous jerk of the whip, knocked them on the head. The little innocents were then, *not bagged* (because the Gauchos had no such receptacle for game), but they were strung, one by one, on a small leathern thong; till six brace, in about fifteen minutes, being taken in this way, home we came with the sport."

We must not leave this estancia without a sketch of the place itself:—

"The floor of our apartment was of mud; so were the walls. The thatch of the roof was but too apparent. Here, in one corner, stood my bed,—there, in another, lay strewed the cumbrous saddle-gear of three or four horses. In two large earthen pitchers stood the water; and the copper-coloured servants that waited on us were dressed in half-naked Indian simplicity. We had change of neither knives, plates, nor forks. Candioti junior, his head capataz, or overseer, and the curate of a neighbouring capilla, ate off the same dish. The chairs were antiquated leather-bottomed chairs, with backs five feet high from the ground. The door stood open, with half a dozen horses saddled, and tied to stakes around it. No pictures graced the walls, no sashes, nay, not even shutters protected the windows, nor did glass make a part of them. Everything around us, even our savoury and abundant cheer, bespoke that we were supping with a nomadic chief.—All bore evidence of the distance at which we were from modern luxury and refinement. The basin in which, like the Jews, we washed hands after meals, was carried round by a *China* or Indian female servant; and a tall mulatto taking off my boots, struck the adhesive clay from them, and put them down by the side of my bed, by way of intimation that this was all I had to expect in the way of cleaning my boots."

We now have an account of an excellent day's sport, enough to tempt a Meltonian across the Atlantic, but we must, however reluctantly, pass on to Corrientes—indeed, through it, for we cannot consent to be detained even by the hospitable post-master, and the pleasant fashion of that broiling country, of *un*dressing, instead of dressing, for dinner; and, at least, enter Paraguay before we conclude even this first notice.

"I soon recognised a striking difference between the character of the country in which I now was, and that of any part over which I had hitherto travelled. The open Pampa was exchanged for the shady grove; the pastures, protected by the trees, and irrigated by abundant streams, were in most places beautifully green; the palm-tree was a frequent occupant of the plain; hills, and more gently-

sloping eminences, contrasted beautifully with the valley and the lake. Wooded from the base to the top, those hills and slopes exhibited now the stately forest-tree, and anon the less-aspiring shrub, the lime, and the orange, each bearing, at the same time, both blossom and fruit. The fig-tree spread its broad dark leaf, and offered its delicious fruit to the traveller without money and without price; while the parasite plant lent all its variety of leaf and flower to adorn the scene. Pendent from the boughs of many of the trees was to be seen, and yet more distinctly known by its fragrance, the air-plant. Squirrels leaped, and monkeys chattered among the branches; the parrot and parroquet, the pheasant, the moigtú, the toocan, the humming-bird, the guacamayo or cockatoo, and innumerable others described by Azara, inhabited, in all their gaudy variety of plumage, the woods through which I rode. There is one noble bird which tenants them, that I never elsewhere saw, except on the lake or on its banks. That bird is the pato real, or royal duck, nearly the size of a goose, but of plumage rich and varied. The lakes are covered with wild fowl, the marshes with water-hens and snipes. On the pasture-grounds you have the large partridge, and on the cultivated enclosures, in great abundance, the small one, or quail. As I pursued my journey through a country so substantially favoured, and so highly adorned by Nature, I was glad to meet with much more frequent traces of cultivation and industry than were to be found in the solitary tracts over which I had heretofore sped my monotonous way. Whitewashed cottages often peeped from among the trees, and around them were considerable fields of the cotton, yucca, and tobacco plants. The Indian corn and sugar-cane were also frequently to be seen in the vicinity of farm-houses of a better character than the cottages; and there was abundance of wood, and of the prickly-pear. With the latter the cultivated country, as well as the potreros or paddocks, were invariably well fenced."

Having now fairly reached Paraguay, we must be content to leave our pleasant companions for the present; fortunately, though in a humble cottage, in good company:—

"I had been struck, as I approached the house, by a singular erection immediately near it. The trunks of four palm-trees, about fifteen feet in height, were driven as stakes into the ground, at intervals which constituted a square of about twenty feet. Between each palm-tree was an intermediate post of equal height, supporting rafters which formed the frame-work of the roof. Over this were spread coarse straw mats of Indian manufacture. The place had the appearance of a high stage, and there was connected with it a long ladder, reaching from the ground to the roof. We supped plentifully upon milk, yucca-root, honey, and a full-grown lamb, roasted entire. Immediately after supper, the numerous family of our host came up to him, and raising their closed hands in the attitude of prayer, said in Guarani, 'Your blessing, my father.' The old man moved his hand, so as to describe with it the figure of a cross, and said to each of his offspring in succession, 'God bless you, my son,' or 'my daughter,' as the case might be. He had a family of nine children, of whom the oldest, a fine young woman, as fair as a European, might be twenty-two; and the youngest, a little Paraguay Gaucho, about eight. They did the same afterwards to their mother, and received from her a similar benediction. Great was my delight in seeing realized, by the children of modern days, this patriarchal homage to their parents: and not less was my surprise, when immediately afterwards I saw them mounting, one by one, up the steep ladder to the top of the stage, and there, after unloosing their slender garments, lying down to repose for the night. Gomez told me that *we* were to sleep up there too, 'para evitar los mosquitos,' in order to avoid the mosquitos;' and no sooner had he informed me that they never rose so high as the roof of the stage, than I mounted with an alacrity not easily conceivable, but by those who have been martyrs to the blistering attacks and tormenting hum of those insatiable insects. While we sat at the cottage door, we had suffered not a little from their bites, and been annoyed by their constant and teazing buz about our ears. Mirabile dictu! No sooner had I attained the enviable eminence, where now, outstretched in sound repose, lay the good man's family, than not a single mosquito or insect of any other kind was to be felt. Up came Gomez; up came the host and his wife; up came three peons; and, finally, up came the ladder. * * The good company thus outstretched beneath the pale moon, consisted of

the Paraguayan's children, in number 9
of their father and mother 2
of Gomez, myself, servant, and postillion .. 4
and of peons 3

in all eighteen; accommodated, without the aid of either bed or bedding, on twelve yards' square of wicker-work, covered with a mat, and at an elevation of fifteen feet above the level of the ground. Only think of people sleeping thus at a gentleman's country-house in England!

Of course, as we have only just crossed the Paraná, we shall proceed hereafter further into the country; but, in the meantime recommend our readers to get the work as soon as possible.

OUR LIBRARY TABLE.

Howell's Odes of Horace.—The Odes in this edition are illustrated by parallel passages from the Greek, Roman, and English poets: we wish that the editor would extend his labours to the Satires and Epistles.

Holliday's Practical Land Surveying.—This is a useful work, containing a great mass of information, arranged with skill and simplicity.

Yankee Notions: a Medley, by Tim. Titterwell.—It was but recently that the peculiarities of American humour occurred to us as a subject on which good speculation and good English might not be altogether wasted. But Mr. Titterwell's 'Yankee Notions' is not of consequence enough to serve as a text. There is no offence in the work, which is the best praise we can bestow on it.

Stenographic Sound-Hand, by Isaac Pitman.—A compendious system, with directions and examples, making a little waistcoat-pocket book of fourteen pages.

Hints on Study and the Employment of Time.—The hints are commonplace, and time may be much better employed than in their study.

List of New Books.—M'Neile's Lectures on the Prophecies relative to the Jews, 2nd edit. 12mo. cl. 4*s.* 6*d.*—Roberts's Village Sermons, 2nd edit. Vol. II. 12mo. cl. 4*s.* 6*d.*—The Young Christian's Sunday Morning, Part 1. cl. 3*s.* 6*d.*—Mimpriss's Continuous History of the Gospel, without maps, 2*s.* 6*d.*, with maps, 12mo. cl. 3*s.* 6*d.*—Geraldine, a Tale of Conscience, 2nd edit. 2 vols. 12mo. bds. 12*s.*—Millennarianism Unscriptural, or a Glance at some of the consequences of that Theory, 12mo. cl. 5*s.*—A Course of Lectures to Young Men, by the Author of 'Sketches and Skeletons of Sermons,' 12mo. cl. 3*s.* 6*d.*—Abbott's Hoary Head and the Valleys Below, 18mo. cl. 2*s.* 6*d.*—Paterson's Roads, 8vo. new edit. 18*s.* bds.—The Parochial System, a Prize Essay, by Rev. H. Wilberforce, fc. 3*s.* 6*d.* cl.—Short Family Prayers for every Morning and Evening in the Month, 3*s.* cl.—An Introduction to the Study of Ecclesiastical History, by Rev. J. G. Dowling, 8vo. 9*s.* bds.—Tomlin's Act for Abolition of Imprisonment for Debt, fc. 2*s.* 6*d.* bds.—Voice from the Font, 12mo. 3*s.* cl.—Parley's Visit to London during the Coronation, square, 3*s.* plain, 4*s.* coloured.—Gems of Anecdote, 32mo. 2*s.* cl.—Gems of Wit and Humour, 32mo. 2*s.* cl.—Smith's Compendium of Mercantile Law, 2nd edit. 8vo. 21*s.* bds.—Tarver's Conversational French Exercises, 12mo. 3rd edit 3*s.* 6*d.* bd.—Waugh's Science of the Cerebro-Spinal Phenomena, fc. 6*s.* cl.—Essays on the Apocalypse, by R. B. Sanderson, fc. 4*s.* cl.—The Christian Naturalist, by Rev. E. Budge, 12mo. 3*s.* cl.—Hancock's Hear the Church, fc. 2*s.* 6*d.* cl.—Letters on the Writings of the Fathers, by Misopapisticus, crown 8vo. 5*s.* 6*d.* cl.—Fallow's Order of Baptism, 12mo. 7*s.* 6*d.* cl.—Barr's Recollections of a Minister, post 8vo. 3*s.* 6*d.* cl.—Sermons and Outlines of Sermons, by Eminent Ministers, 12mo. 4*s.* 6*d.* cl.—The Naturalist's Library, Vol. XXII. fc. 6*s.* cl.—Rowland on Neuralgia, 8vo. 6*s.* bds.—Wayland's Elements of Political Economy, 18mo. 2*s.* cl.—Scheming, a Tale, by Mrs. Godwin, 18mo. 2*s.* cl.—Readings in Science, new edit. fc. 5*s.* cl.—The New Testament, edited by A. Campbell, new edit. 12mo. 4*s.* 6*d.* cl.—Mason on Episcopacy, with Introduction, &c. by Rev. J. Blackburn, 12mo. 3*s.* 6*d.* cl.—Aristomenes, 2 vols. 8vo. 21*s.* cl. Granville's Spas of Germany, 2nd edit. 1 vol. 8vo. 18*s.* cl.—Lush's Act for Abolition of Arrest, 12mo. 5*s.* bds.—Wells's Act for abolishing Imprisonment for Debt, 2nd edit. 12mo. 2*s.* 6*d.* swd.—Bentham's Works, Part V., edited by Dr. Bowring, royal 8vo. 2*s.* cl.—Scatchard's Memoirs of Eugene Aram, 2nd edit. 12mo. 1*s.* swd.—Ellis's Tariff, 1838 9, 12mo. 5*s.* 6*d.* cl.—Walker's Original, new edit. 8vo. 8*s.* cl.—Reitzsch's Fancies and Truths, 4to. 10*s.* 6*d.* bds.—Bourne's Railway, No. I. 2l*s.* swd.—Colburn's Modern Novelist, Vol. XIV., "Sayings and Doings, 2nd series," fc. 6*s.* cl.—De Porquet's French Spelling Book, new edit. 2*s.* 6*d.* cl.—De Porquet's Introduction to Parisian Phraseology, 12mo. new edit. 1*s.* 6*d.* cl.—Theobald's Imprisonment for Debt Act, 12mo. 5*s.* bds.—Bertinchamp's French Student, 12mo. 3*s.* cl.

EIGHTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[*From our own Correspondents.*]

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.—THURSDAY.

Prof. Phillips read a communication from Prof. Forbes 'On Subterranean Temperature; and notice of a Brine Spring emitting Carbonic Acid Gas.'

Prof. Forbes had sunk a number of thermometers in the earth at 26, 13, 6½, and 3¼ feet below the surface, in the neighbourhood of Edinburgh, for the purpose of ascertaining the variation of the temperature in different seasons, and the limits of the influence of the sun in descending. Four thermometers, to which a fifth has since been added, were deposited in each of the following stations:—1. In the trap rock of the Calton Hill; 2. In the solid sandstone of Craigleith quarry; 3. In a fine bed of sand in the Botanic garden. Prof. Forbes is at present in Bavaria, and his communication from thence stated that these observations have been continued with perfect regularity since the date of his last communication, making in all, up to the time of his leaving Scotland, a period of sixteen months; farther, that he has had more than a complete year's observations copied, corrected for the temperatures of the stems of the thermometers, and projected in curves; the results of which, together with an account of the construction of the instruments, he hoped to be ready to lay before the next meeting of the Association. That no material change had occurred in the method of the observations, with the exception of the addition of the fifth thermometer to each set; some of the thermometers which, from having too short scales, were incapable of giving the results at the maximum point, had been carefully opened by Mr. Adie and himself, some of the spirit withdrawn, and the top again successfully closed. One of the sets of thermometers gives indications which seem evidently to show the anomalous influence of infiltrated water through crevices in the rock in which it is sunk, the lowest thermometer (at a depth of 25 feet 10 inches) having a range annually of 4° instead of 2°, as in both the others, which seems to show how desirable it is to have several such sets established at one place, and how material may be the theoretical errors founded on a single set of observations. The letter of Prof. Forbes then noticed a remarkable spring, about a mile from Kissingen, Bavaria, which had occupied much of his attention, and of which he will probably at a future time draw up a detailed account. It is a *brine spring*, having 3 per cent. of salt, rising in a bore 325 Bavarian feet deep, in red sandstone; but he understands that the water flows at about 200 feet in depth. Its temperature is never less than 65°; the mean temperature of springs near being only 50° to 52°. It discharges carbonic acid gas in volumes almost unexampled, keeping the water, in a shaft eight feet diameter, in a state resembling turbulent ebullition. The enormous supply of gas has led to its use in gas baths, for which purpose it is carried off by a tube connected with a huge inverted funnel, which rests upon the water. It contains scarcely a trace of nitrogen. It is conducted into chambers properly prepared, and thence into baths, in which it lies by its weight, and is used as water would be. But the most remarkable feature still remains. About five or six times a day the discharge of gas suddenly stops; in a few seconds the surface of the well is calm. The flow of water, amounting to *forty cubic feet* per minute, also stops, or rather becomes *negative*, for the water recedes in the shaft even when the pumps, commonly used to extract the brine, do not work, and the water subsides during fifteen or twenty minutes. It then flows again, the water appearing first and suddenly, the gas gradually increasing in quantity till, after three quarters of an hour, the shaft is full as at first. The state of greatest discharge continues with little variation for three or four hours, but by no means with absolute regularity. It is also affected by various circumstances, apparently extraneous, which Prof. Forbes had not time to mention; this has gone on with little variation since the bore was made in 1822. Within a short distance is a bore 554 Bavarian feet deep, which exhibits somewhat similar phenomena. Altogether, Prof. Forbes considers that the salt spring at Kissingen is the most singular phenomenon of its kind in Europe except the Geysers.

Mr. Russell now gave a description of a 'Substitute for the Mountain Barometer in Measuring Heights,' by Sir John Robison.

Mr. Russell said, that all persons who had used the mountain barometer, when measuring heights, would admit that it was a very cumbersome instrument, put out of order by very slight accidents, and only to be used by persons well skilled in observing. Now, the principle of Sir John Robison's contrivance was simple, and such that the most ignorant person might be intrusted with the preparatory manipulation of it, and might be sent up mountains when the philosopher could not leave his study, and bring back the air to be experimented upon; and, since he could not go to the air with his barometer, to cause it to come to him. It consisted of a wooden box, containing simply a thermometer and a number of tubes, of a bore something wider than those of self-registering thermometers, open at one end, and blown into bulbs at the other, also a small vessel of quicksilver. All the person, who went up the mountain, had to do, was to note the thermometer, and immerse the open end of one of the tubes into the mercury at each station, and then bring down the whole. The examiner then places each bulbed tube, into the stem of which a considerable quantity of mercury will, of course, be found to have entered, under the receiver of an air pump, either along with a barometer or with a well-made gauge: and on pushing the exhaustion until the mercury stood within the bulbed tube as it did upon the mountain, making certain simple allowances for temperature, the height at which the barometer would have stood at the station on the hill can be deduced; and thence, by the usual calculation, the height of the station. [We have since seen the instrument, and find that its stem is previously graduated by the maker, so that bare inspection shows the density of the air at the elevated station].

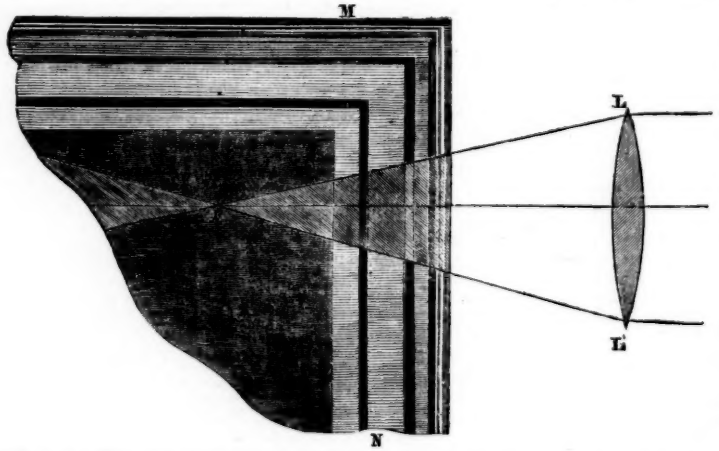
Prof. Chevallier said there was a very portable instrument, the Sympiesometer, the principle of which seemed to him to be the same as that contrived by Sir John Robison.—Sir J. Herschel presumed Prof. Chevallier meant Adie's Sympiesometer; if so, he would find, on consideration, that the principle of Mr. Adie's Sympiesometer was the compression of a confined portion of gas, and not at all the same as that of Sir John Robison.—Prof. Stevelly said, he was glad to find the air pump thus beginning to be made subservient to such inquiries; he trusted its use would yet be extended to ascertaining, roughly at least, the heights of the clouds in different states of the weather, by a method which, if the time of the Section were not so precious, he would have alluded to; it was founded on a well-known fact, the appearance of cloud in the exhausted receiver of an air pump.

The President then made a communication respecting Halley's Comet.

One of the most interesting series of observations, of a miscellaneous kind, I had to make at the Cape of Good Hope, was that of Halley's comet. This comet is the great glory of modern calculation. To see the predicted return of such a body now verified for the second time, true to a single day,—nay, to a few hours—of his appointed time, after an absence of seventy-five or seventy-six years, during which it has been subjected to the unceasing perturbations of all the planets, and especially persecuted by Jupiter and Saturn, those great stumbling blocks of comets, is really superb. However, what I have now to relate refers to a very singular and instructive fact in its physical history. I saw the comet for the first time, after its perihelion passage, on the night of the 25th of January. Mr. Maclear saw it on the 24th. From this time we, of course, both observed it regularly. Its appearance at first was that of a round, well-defined disc, having near its centre a very small bright object exactly like a small comet, and surrounded by a faint nebula. This nebula, in two or three more nights, was absorbed into the disc, and disappeared entirely. Meanwhile, the disc itself dilated with extraordinary rapidity, and by measuring its diameter at every favourable opportunity, and laying down the measures by a projected curve, I found the curve to be very nearly a straight line, indicating a uniform rate of increase; and by tracing back this line to its intersection with its axis, I was led, at the time, to this very singular conclusion,—viz. that on the 21st of January, at 2h. P.M., the disc must have been a point—or ought to have no magnitude at all! in other words, at that precise epoch some very remarkable change in the physical condition of the comet must have commenced. Well! all this was speculation. But here comes the matter of fact I refer to, and which, observe, was communicated to me no longer ago than last month by the venerable Olbers, whom I visited in my passage through Bremen, and who was so good as to show me a letter he had just received from M. Boguslawski, Professor of Astronomy at Breslau, in which he states that he had actually procured an observation of that comet on the night of the 21st of January. Well then, how did it appear? why, as a star of the sixth magnitude—a bright concentrated point, which showed no disc, with a magnifying power of 140! And that it actually *was* the comet, and no star, he satisfied himself, by turning his telescope on that point where he had seen it. It was gone! Moreover, he had taken care to secure, by actual observation, the place of the star he observed; that place agreed to exact precision with his computation: that star *was* the comet, in short. Now, I think this observation every way remarkable. First, it is remarkable for the fact, that M. Boguslawski was *able* to observe it at all on the 21st. This could not have been done, had he not been able to direct his telescope point blank on the spot, by calculation, since it would have been impossible in any other way to have known it from a star. And, in fact, it was this very thing which caused Maclear and myself to miss procuring earlier observations. I am sure that I must often have swept, with a night-glass, over the very spot where it stood in the mornings before sunrise. And never was astonishment greater than mine at seeing it riding high in the sky, broadly visible to the naked eye, when pointed out to me by Mr. Maclear, who saw it with no less amazement on the 24th. The next remarkable feature, is the enormously rapid rate of dilatation of the disc and the absorption into it of all trace of the surrounding nebula. Another, is the interior cometic nucleus. All these phenomena, while they contradict every other hypothesis that has ever been advanced, so far as I can see, are quite in accordance with a theory on the subject, which I suggested on the occasion of some observations of Biela's comet,—a theory which sets out from the analogy of the precipitation of mists and dews from a state of transparent vapour on the abstraction of heat. It appears to me, that the nucleus and grosser parts of the comet must have been entirely evaporated during its perihelion, and reprecipitated during its recess from the sun, as it came into a colder region; and that the first moment of this precipitation was precisely that I have pointed out as the limit of the existence of the disc,—viz. on the 21st of January, at 2 P.M., or perhaps an hour or two later.

'On a New Phenomenon of Colour in certain specimens of Fluor Spar,' by Sir D. Brewster.

Mineralogists have long ago observed, in certain varieties of fluor spar, a beautiful *blue colour*, different from that which is seen by transmitted light. Haüy noticed this property in some of the fluor spars from Derbyshire. Succeeding mineralogists, however, have confounded this colour with the ordinary tints of the spar, and, in so far as I know, (said Sir D. B.) its nature and origin have not been successfully investigated. In describing a species of dichroism, noticed by Dr. Prout* in the purpurates of ammonia and potash, Sir John Herschel† ascribes the reflected green light to "some peculiar conformation of the green surfaces, producing what may be best termed a *superficial colour*, or one analogous to the colour of thin plates, and striated or dotted surfaces." And he adds—"A remarkable example of such superficial colour, differing from the transmitted tints, is met with in the green fluor of Alston Moor, which on its surfaces, whether natural or artificial, exhibits, in certain lights, a *deep blue* tint, not to be removed by any polishing." As the phenomenon which I had studied in the Derbyshire fluors was clearly one of internal structure, I was led to suppose that the superficial colour seen by Sir John Herschel on the Alston Moor specimens, belonged to another class of phenomena; but having attempted in vain to communicate the blue colour of the Alston Moor crystals to *wax* or *isinglass*, I am disposed to believe that the two phenomena are identical. In the fluors from Derbyshire, which consist of differently coloured strata parallel to the faces of the cube, the blue colour is most powerfully developed in the purplish brown or bluish brown strata, in a less degree in the greenish strata, and scarcely, if at all, in those layers which are colourless by transmitted light. In the first of these cases, the blue colour may be distinctly seen emanating from the interior of the crystal, when it is held in the common light of day. In the sun's light the colour is still more brilliant; but the effect may be greatly increased by covering the greater part of the crystal with black wax, or by immersing it in a trough of glass covered externally with wax, and containing an oil of nearly the same refractive power as the spar. If there are fissures within the crystal, they will greatly influence the effect of the experiment, by reflecting to the eye the transmitted light. In order, however, to witness this experiment in all its beauty, and to have ocular evidence of its nature and character, a beam of condensed solar light should be transmitted through the crystal, as shown in the annexed figure, where L L is the con-



densing lens, F its focus, and M N the system of differently coloured layers, traversed by the cone of refracted rays. The first layer of spar reflects in all directions an *intensely blue* light; the two adjacent layers (separated by a thin layer which reflects blue light) reflect a light nearly white; the next layer gives a blue of exceeding brilliancy; and so on with the other layers, till the cone reaches the brown central nucleus, which also reflects a rich blue tint though inferior to that of one of the preceding layers. In the green fluor of Alston Moor there are also different layers, some of which are *pink*, and some of different shades of *green;* but the different shades of blue, which they give out under exposure to strong

* Phil. Trans. 1818, p. 424.
† Treatise on Light, sec. 1076.

light, are not so strikingly contrasted as in the Derbyshire specimens. As the blue colour now described is reflected from surfaces within the spar, and as it does not occur in all specimens, nor in every part of the same crystal, it must be produced by extraneous matter of a different refractive power from the spar, introduced between the molecules of the crystal during its formation. That the blue colour is not produced by shallow cavities or minute pores, as in some of the opals, I infer from the perfect transparency of the specimens in which it occurs, and, from the fact, that I have found the same reflected tints in fluids, particularly the juices of plants extracted by alcohol, and in several artificial glasses, particularly in those of a *pink* and *orange* colour, the former of which give a *blue* and the latter a *green* colour. Having found that some of the dichroitic colours in doubly refracting crystals were discharged by heat, it occurred to me that the blue tints in fluor spar might suffer a similar change, and might even be connected with the phosphorescence of the mineral. I, therefore, exposed two pieces,—one of the Derbyshire, and one of the Alston Moor fluor, to a considerable heat. Both of them gave out a blue phosphorescence, similar to that of the reflected tint, and much of the natural colour of the fragments was discharged by the heat. In both specimens the blue reflected tint was greatly diminished. In another specimen of the Alston Moor fluor, it appeared to be wholly removed; but in a third, taken from the solid angle of the cube, the blue tint still appeared, though with an impaired brilliancy. It is possible, that a very intense heat might discharge the blue tint altogether; but it is difficult to obtain satisfactory results with a mineral which decrepitates by the action of heat, and thus prevents the observer from comparing the tints, under circumstances exactly the same.

Sir J. Herschel did not think that the phenomenon could arise from any of the rays being extinguished within the crystal. He was inclined to attribute it to some irregularity of structure, inasmuch as it manifested itself occasionally in some kinds of liquids. On one occasion he was conversing with M. Arago respecting the deep blue colour of the Lake of Geneva, and M. Arago was inclined to attribute it to some such internal structure as from an unknown cause was to be sometimes seen in fluor spar. The paper of Sir D. Brewster was a proof that this thought was neither conceived nor expressed at random. Perhaps the same account was to be given of the azure of the sea, and its deep green, sometimes so very striking.—Sir D. Brewster said that Sir H. Davy had attributed the deep blue of the Swiss lakes to extreme purity in the water, and instanced the appearance of the water in the baths at Sheffield, which, being lined with a very pure white marble, a blue tinge was given to the marble by the water. The Scottish lakes were also very pure, and particularly in the Grampians; even the small lakes of the quarries of Cairngorum presented this blue tinge. A similar structure to that he had described in fluor spar was also to be occasionally seen in Labrador felspar. Vegetable greens also, when extracted by alcohol, gave very remarkable results in their relation to light: thus, if the colour was extracted from common bay leaves by alcohol, upon placing the solution in a deep glass vessel and covering up most of the sides so as to permit the light to enter only at the bottom, the vessel appeared to be entirely of a blood red colour; this he attributed to the light, compelled to traverse long spaces in coming through the liquid, being reflected frequently at the sides.—Sir J. Herschel was rather inclined to attribute the phenomenon last described by Sir D. Brewster, to the light which was complementary to the colour of the fluid being alone permitted to reach the eye.—Sir W. Hamilton said it was well known that when persons went down a certain depth into the sea a very curious play of colours took place. He had experienced this on one occasion when he went down in a diving bell; the red colour, in which everything appeared to be enveloped, was very beautiful.—Sir J. Herschel suggested that a diving bell placed upon the Lake of Geneva might enable philosophers to decide this and many other interesting questions, respecting the waters of that lake.—Dr. Robinson stated that the waters of a lake called Glasslough, in the county of Monaghan, in Ireland, was of a very remarkable bluish green colour, the word glass having that meaning in Irish; and he had the pleasure to inform the Section that this was lately discovered to be caused by the waters of the lake being filled with multitudes of small animals of the oscillatoria species, by his friend Dr. James L. Drummon, of Belfast.—A gentleman observed that the waters of the Lake of Shade had their colour from a vegetable matter which grew towards the bottom, and he had little doubt but that the waters of the Lake of Geneva and of other lakes derived their colours from a similar source.—Sir Charles Monck said, that if any person would remark the slates which came from various localities, particularly those from Wales, he would observe the great variety of deep colour which they exhibited, particularly greens, purples, and blues of various shade; now it appeared to him not at all improbable that the rapid waters of the Rhone, which were often as dark blue as the water which ran from a dyer's vat, carried down finely disintegrated particles from the slate countries which they traversed, and that something like this might be the cause of the deep blue, both of the Lake of Geneva and of the waters of the Rhone. He was the more inclined to think so when he called to mind the opinion that prevailed, that the ancient ultramarine colouring matter was found in this locality.—Sir J. Herschel said, that although it was possible that this colour might be derived from foreign matter, held in suspension by the waters of the river and of the lake, yet he thought it more probable that it arose from the very great purity of the water, for it was to be remembered that the clefts or chasms between the ice, when looked down into, exhibited this colour, as did also the snow occasionally, as was very remarkable when you thrust a stick into it; but this question could perhaps only be decided by descending under the waters of the lake by the aid of a diving bell, and thence examining the fixed lines of the solar spectrum.

The Rev. J. Watson then read a paper 'On the Helm Wind of Crossfell.'

Helm Wind is a local name of uncertain derivation, but generally supposed to be so called from the cloud that, like a cap or helmet, is often seen on the top of the mountains, and applied to a very violent wind, blowing frequently from some easterly point of the compass, but mostly due east at the west side of the mountains known by the name of the Crossfell range, and confined both in length and breadth to the space contained between the Helm and Helm Bar, hereafter described. Along the top ridge of the mountains, and extending from three or four to sixteen or eighteen miles each way, north and south from the highest point, is often seen a large long roll of clouds; the *western* front clearly defined and quite separated from any other cloud on that side; it is at times above the mountain, sometimes on its top, but most frequently descends a considerable way down its side; this is called the Helm. In opposition to this and, at a variable distance towards the west, is another cloud with its *eastern* edge as clearly defined as the Helm, and at the same height: this is called the *Bar* or *Burr*, the space between the Helm and the Bar is the limit of the wind. The distance between the Helm and Bar varies as the Bar advances or recedes from the Helm, this is sometimes not more than half a mile, sometimes three or four miles, and occasionally the Bar seems to coincide with the horizon, or disperses and there is *no* Bar, and then there is a general east wind extending over all the country westward. However violent the wind be between the Helm and the Bar, it ends there, as on the west side of the Bar there is either no wind or it blows in a contrary direction, that is, from the west, or from various points in sudden and strong gusts, when the Bar advances so far as to unite with the Helm, or it disperses and then the wind ceases. Neither the Helm nor Bar are separate or detached clouds, but may be rather said to be the bold, clearly defined front of a body of clouds extending eastward behind the Helm, and westward from the Bar. The clouds forming the Helm and Bar cannot perhaps be strictly said to be parallel; the open space between them may rather be called a very flat ellipse, in which the transverse diameter varies from eight or ten to twenty-five or thirty miles, and the conjugate from half a mile to four or five miles, they are always united at the ends. A simple representation of the Helm, Bar, and space between, may be made by opening the forefinger and thumb of each hand and placing their tips to each other; then suppose yourself looking towards the west, the thumbs will represent the Helm on the top of the fell, the forefingers the Bar, and the open space between the variable limit of the wind. The Helm is always parallel to the fell. This wind is very irregular, but most frequent from the end of September to the month of May; it seldom occurs in the summer months; there was one this year, 1838, on the 2nd of July, and there have been more in the last two years than in the preceding six. Sometimes, when the atmosphere is quite settled, not a breath of wind stirring, and hardly a cloud to be seen, a small but well known cloud appears on the summit, extends itself to the north and south—the Helm is on, and in a few minutes blowing furiously, sufficient to break trees, overthrow stacks of grain, throw a person from his horse, or overturn a horse and cart. The Helm at times seems violently agitated, and on ascending the fell and entering it there is little wind, and this sometimes not in the direction of the wind below—you may, in fact, be in the Helm for a whole day without being aware of the wind on the west. The Helm appears sometimes to run or pour off from the highest point, each way towards the north and south points of the junction of the Helm and Bar, and there to be piled up in great masses; occasionally a Helm forms and goes off without a blast. The open space between the Helm and Bar is clear of clouds, with the exception of small pieces breaking off now and then from the Helm and being rapidly driven over to the Bar; through this open space is often seen a higher stratum of clouds quite at rest. Most mountainous countries, particularly where the mountains terminate abruptly, seem liable to sudden gusts of wind, such as occur at the Cape of Good Hope, in Switzerland, and among the lakes in our own country; but the Helm wind differs from all in respect to the Bar, and that within the space described it blows *continually*; it has been known to blow for nine days together, the Bar advancing or receding, or continuing stationary for a day. When heard and felt for the first time it does not seem so very extraordinary; but when you find it blowing and roaring morning, noon, and night for days together, it makes a strong impression on the mind, and you are compelled to acknowledge that it is one of the most singular phenomena of meteorology. Its sound is peculiar, and when once known is easily distinguished from that of ordinary winds; it cannot be heard more than three or four miles beyond its limit, but when within the wind or near it, it has been compared to the noise made by the sea in a violent storm, or that of a large cotton mill when all the machinery is going. It is seldom accompanied by rain within the open space, and never continues long after it begins to rain heavily; in spring, it is most frequent after rain. The country subject to it is very healthy, but the wind does great injury to vegetation, as it batters the grain, grass, and the leaves of trees till they are quite black. Various theories have been suggested to account for this phenomenon; the most plausible are that the air collects and cools on its gradual ascent from the east coast, and on reaching the summit rushes with great force down the western escarpment into a lower and warmer region: the objections to this are, that the valley of the Tyne, where there are no Helm winds, is not much higher than that of the Eden; and secondly, the wind does not extend farther west than where the Bar is vertical, and this not very often so far as the Eden. The cause, Mr. Watson said, must be sought for in that region of the atmosphere, extending from 800 to about 5000 feet above the earth's surface.

Prof. Stevelly said he felt a peculiar interest in this subject, because a series of phenomena almost identical, except as to the points of the compass, is frequently manifested in the locality from which he came, in Ireland [Belfast].—Dr. Barnes bore witness to the accuracy of the description of this wind and the attendant phenomena as given by Mr. Watson, and the extreme similarity of those referred to by Mr. Stevelly, while the points of the compass were so different that some common meteorological origin must be assigned to them both.—Colonel Reid rose to say, that similar phenomena were to be seen frequently in the West India islands, as also in the Mauritius.—Sir J. Herschel was very familiar with a series of phenomena constantly presented by

the range of mountains which included the Table Mountain. Whenever the wind blew from the south-east, and also, but in a less remarkable manner, when it blew from the north-west, the Table Mountain became covered with masses of cloud, which rolled over in volumes as if it would overwhelm the entire country, but it melted away before it reached the low ground. So soon as the cloud began to come off the wind blew with a vehemence which scarcely anything could withstand. In the bay, at a considerable distance, another cloud was formed across, similar to that which in the instance of the Helm wind Mr. Watson had described as the Bar cloud, and beyond that another, and so on to a distance of from twelve to fifteen or twenty miles. In his opinion these clouds were formed by the rebound of the air as it blew violently from the ground up again to the region of the clouds.—Professor Bache remarked that as the chairman and Professor Stevelly had described a phenomenon which seemed to show that this Helm wind was referable to general causes, he would describe briefly a similar observation made by him in crossing the Mont Cenis, in the month of June last. On the south-east side of the mountain the wind was south-easterly, very moderate, warm, and with a high dew point, and occasional showers. On rising to the table land on the top of the mountain, he found a violent westerly wind sweeping over the plain: this wind was cold, and with a low dew point, as evidenced by the parching sensation in the skin when exposed to its blasts. On a high peak, and on the lee side of the peak as regarded this westerly wind, the Professor observed a cap of clouds, by the stationary appearance of which his attention was arrested, in surprise that this was not carried off by the wind. He saw then that the westerly wind was deflected upwards by the nearly perpendicular bluff against which the cloud rested. In the calm space behind the bluff the cloud formed, and its edges, from time to time were blown away, or into thin streamers by the gusts of wind. This formation of cloud the Professor was disposed to attribute to the mixture of the cold current from the west with the warmer current from the east, which he had observed in the gorge on the eastern side up which he had passed.

Dr. Smith read a paper on the 'Variations in the Quantity of Rain which falls in different Parts of the Earth.'

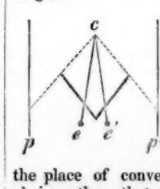
Effects so very local, as shown by rain-gauges, at short distances apart in our island, must arise, Dr. Smith imagines, from local causes. If the general remark, that much less rain falls on the eastern than on the western side of England, stands confirmed by the tables, and by Edinburgh being only 22 inches, and Dublin 22.2, it seems likely to hold in other parts. The local variations in the quantities of rain in England are, however, very great; and in a short table of sixteen local averages, from 67 inches at Keswick, down to 22.7 at South Lambeth, the half of them on the western side of England are by far the highest; but the comparatively small quantities of rain at Bristol and Chatsworth not according with this generalization, and one place on the eastern coast being even higher than these, and higher than Liverpool, this generalization, he conceived, could not hold. More local causes seemed, therefore, requisite to account for the observed facts; and Dr. Smith imagines that they are to be found in the nature of the surrounding country; that is, in the physical differences of the vicinity of each place, and in the track of the most rainy winds; and accordingly he found this confirmed by a long average of westerly and easterly winds at London, compared with six other places—four on the western, and two others on the eastern side of Britain.

The S.W. wind blowing in London,	112	N.E.	58
W.	53	S.E.	22
N.W.	50	E.	26
S.	18	N.	16
	233		132

Showing that, although westerly winds blow 101 days more than the drier easterly winds, yet London is the least rainy place in Britain, except Edinburgh, which averages seven lower than South Lambeth. The cause of much rain depends not, therefore, he conceived, on the prevalence of westerly winds; but he observed, those winds, before they reach London, pass over a great extent of high and dry land; and, consequently, there is, at the level of the chalk hills (6 to 800 feet), a dry atmosphere over London. Again he observed, that Bristol, having 5.2 inches less rain than Liverpool, and nearly 7 inches less than Manchester, is surrounded by high and dry hills of limestone; and Chatsworth, 4 less than Bristol, is also, except on the eastern side, surrounded by very high and dry hills. Dr. Smith illustrated this part of his argument by reference to other places. Manchester 36.1, is not far west of the high and damp hills of England's vertebral chain; but about Lancaster, the width of wet-topped hills increases, so that vapour from these, the southern swampy shore, and of the tides and sands of Morecambe Bay, may account for 39.7 at Lancaster; Townly, high, and in the vicinity of bog-topped hills, has 41.5; Grisdale, Westmorland, 52.3; and Kendal 53.9: the latter, perhaps, partly from the hills, and partly from Lancaster Sands and adjacent marshes; but Keswick averages 67 inches, which, perhaps, is the greatest quantity of rain which falls at any one place in England, seemingly to be accounted for by its peculiar situation at the meeting of four valleys, which intersect a group of very high mountains, and near to swampy ground, and very large pieces of water, on which the winds have great influence in raising vapour, which the cold sides of the mountains rapidly condense. These hill tops, as well as those of Millstone-grit, have a covering of peat, which holds water like a sponge.

Prof. Wheatstone read a paper 'On Binocular Vision; and on the Stereoscope, an instrument for illustrating its phenomena.'

Prof. Wheatstone stated that, at the last meeting of the Royal Society, he had presented the first of a series of papers on the phenomena of vision, in the investigation of which subject he had been for some years engaged. He did not, he said, on the present occasion, intend to enter on the consideration of any of the views and conclusions of that paper, for they related rather to mental than to physical philosophy, and they would probably appear in the forthcoming volume of the Philosophical Transactions,—he proposed merely to state so much as would enable him to explain the experiments which the apparatus on the table was intended to exhibit. This apparatus he called a Stereoscope, from its property of presenting to the mind the perfect resemblances of solid objects. To understand the principles on which it was constructed, he explained the circumstances which enable us to distinguish an object in relief from its representation on a plane surface; he showed that when a solid object, a cube for instance, was placed at a short distance before the eyes, its projections on the two retinæ form two dissimilar pictures, which in some cases are so different, that even the eye of an artist would with difficulty recognize them as representations of the same object; notwithstanding this dissimilarity between the two pictures, the object is seen single; and hence it is evident that the mind perceives the object in relief, in consequence of the simultaneous perception of the two monocular pictures. He next showed, that if the object were thus drawn, first as it appears to the right eye, and then as it appears to the left eye, and those two pictures be presented one to each retina, in such manner that they fall on the same parts as the projections from the object itself would, the mind perceives a form in relief, which is the perfect counterpart of the object from which the drawings have been taken: the illusion is so perfect, that no effort of the imagination can induce the observer to suppose it to be a picture on a plane surface. Prof. Wheatstone described various modes by which the two monocular pictures might be made to fall on similar parts of the two retinæ; but he gave the preference to a method which we will endeavour to explain by means of a diagram.



e e' are the two eyes of the observer placed before two plane mirrors, inclined to each other at an angle of 90°; the axes of the eyes converge to a point c; the pictures p p' are so placed on sliding panels, that their reflected images may be adjusted to appear at the place of convergence of the optic axis; it is obvious, then, that the pictures on the retinæ will be precisely the same as if they proceeded from a real object placed at c. In this manner may solid geometrical forms, crystals, flowers, busts, architectural models, &c. be represented with perfect fidelity, as if the objects themselves were before the eyes. The law of visible direction, which is universally true for all cases of monocular vision, may, Prof. Wheatstone stated, be extended to binocular vision, by the following rule: that every point of an object of three dimensions is seen at the intersection of the two lines of visible direction, in which that point is seen by each eye singly. We shall not enter into the subject more largely, because our readers will find an account of Prof. Wheatstone's experiments and philosophical views, in our report of the proceedings of the Royal Society, to which we refer our readers—(see *ante*, p. 538).

Sir David Brewster was afraid that the members could scarcely judge, from the very brief and modest account given of this principle, and the instrument devised for illustrating it, by Prof. Wheatstone, of its extreme beauty and generality. He considered it as one of the most valuable optical papers which had been presented to the Section. He observed, that when taken in conjunction with the law of visible direction in monocular vision (or vision with one eye), it explains all those phenomena of vision by which philosophers had been so long perplexed; and that vision in three dimensions, which M. Lehot, a French author, had attempted to account for by a very unscientific theory, received the most complete explanation from Mr. Wheatstone's researches.—Sir John Herschel characterized Mr. Wheatstone's discovery as one of the most curious and beautiful for its simplicity, in the entire range of experimental optics.

The Rev. Charles Graves, F.T.C.D. read a paper 'On a General Geometric Method.'

The Rev. Charles Graves was led to the views he was about to explain, from observing the use in the doctrine of Conic Sections, of a theorem given by M. Chasles, in his 'Histoire de la Geometrie,' viz., that "*The anharmonic relation of four lines drawn from four fixed points in a conic section, to any fifth point in the curve, will remain invariable.*" Mr. Graves explained the term "*anharmonic relation*," as employed by M. Chasles, to mean the ratio of Sin. (a, d), Sin. (b, c) to Sin. (a, b) Sin. (c, d); a, b, c, and d, being right lines diverging from the same point. He insisted on the importance of M. Chasles's theorem, as a kind of geometrical characteristic of the conic sections, defining them like an equation; and showed how it might be advantageously applied in the determination of loci; and also in the invention, proof, and generalization of theorems relating to the conic sections. In ascertaining whether the plane curve described by a point, subject to a certain condition, is a curve of the second degree or not, the general method that suggests itself is, to find four particular positions of the point, and to draw from these right lines to any fifth point in the locus. If the anharmonic relation of these four lines be invariable, the curve will be a conic section, and not otherwise. Among several exemplifications of this method, Mr. Graves discussed the problem of finding the locus of the centres of all the conic sections passing through four given points. The middle points of the sides of the quadrilateral, at whose angles are the given points, being evidently situated on the locus, it was sufficient to show that the anharmonic relation of lines drawn from them to any other point in it, was constant; and this follows immediately from a theorem announced by Mr. Graves, viz., that "*the anharmonic relation of four diameters of a central conic section, is the same as that of their four conjugates.*" In order to connect this mode of investigation with the ordinary algebraic method, Mr. Graves formed the equation of a conic section passing through the four points (x', o), $(-x'', o)$, (o, y'), $(o, -y)$, (the axes of co-ordinates being made to pass through the points,) and finding only the co-efficient of xy to remain indeterminate, he established the following equation between this co-efficient B, and (r) the anharmonic relation of four lines drawn from any point in the locus to the four given points, $r = \frac{x'y'' + x''y' - B}{x'y' + x''y'' + B}$.

From this Mr. Graves deduced some elegant consequences, and pointed out the readiness with which M. Chasles's theorem serves to group together, and to prove other very general ones; such, for instance,

as that of Pascal, relating to irregular hexagons, inscribed in conic sections, of which it furnishes by far the shortest and most elegant proof yet obtained. He concluded with the expression of a wish, that mathematicians would not disdain to employ the resources of geometry combined with analytic methods in the treatment of conic sections, many valuable properties of which have been lost sight of by those who seem to consider the study useful only as an exercise in the application of algebra to geometry.

Sir William Hamilton observed, that after the wonders performed by Newton in this branch of pure mathematics, he often felt inclined to regret that no person of sufficient knowledge and ingenuity applied himself to its improvement and advancement, and he was glad that a person so well fitted for the task as Mr. Graves had taken it up. For his part (perhaps it was habit), he felt himself so wedded to the analytic method, that he feared he was now too far removed from the other, even to yield to it that importance which others might think its beauty and clearness demanded for it.

Section B.—Chemistry and Mineralogy.

Thursday.

'On the Foreign Substances contained in Iron,' by Thomas Thomson, M.D.

The best Dannemora iron, common Welsh iron, and Low Moor iron, were found to have the following specific gravities:—

Dannemora iron	7.9125,	or	1000
Low Moor iron	7.3519	—	929
Welsh iron	7.4359	—	939.7

Dannemora iron was composed of

Iron	99.56
Carbon	0.36
Manganese	0.05
Silicon	0.03

Low Moor iron of

	99 90
Iron	98.060
Manganese	1.868
Silicon	0.090

Welsh iron of

	100.018
Iron, with a little Manganese	99.498
Phosphorus	0.417
Silicon	0.085
	100.

Prof. Johnston read a paper 'On some Exceptions to the Law of Isomorphism,' showing that substances crystallizing in the same form, were not always composed of the same formulæ, according to the opinion generally received. He illustrated his opinions by diagrams, and gave the results of various experiments.

The Chairman held that the established theory was correct, and accounted for the seeming discrepancy which Prof. Johnston had shown, by observing that the crystals, though appearing the same in form, might adhere together in a different manner; also that they might have a different refraction, which would account for the appearances which presented themselves to Prof. Johnston, without making against the received doctrine.

Mr. Mallet stated the nature and present state of experiments, which had been entered upon in Dublin, in accordance with the instructions of the Association, on the action of long-continued heat, at 212° Fahr., on organic and inorganic bodies, but he was not as yet able to lay before them any results.

'On the Decomposition which is produced by the Action of Emulsin on Amygdalin,' by Dr. R. D. Thomson and Mr. T. Richardson.

Some years ago, Robiquet and Boutron-Charlard showed, that volatile oil of bitter almonds and prussic acid, which are obtained by the distillation of bitter almonds, do not exist naturally in the almonds, but result from the process. They further ascertained, that when milk of bitter almonds, formed by triturating almonds with water in a mortar, is treated with strong boiling alcohol,—on cooling, white crystals are deposited, which separate in larger quantity on cooling. To this substance they gave the name of *Amygdalin*. Liebig and Wöhler have determined this body to be an amide of amygdalic acid, represented by the following formula:—

$$N_2\ C_{40}\ H_{54}\ O_{22} + H_4\ O_2$$

Subsequently the investigation was continued by Wöhler and Liebig, who observed, that when a solution of amygdalin is brought into contact with a milk of sweet almonds, a most remarkable and peculiar action takes place—prussic acid and oil of bitter almonds are formed, as in the instance already mentioned, when milk of bitter almonds is distilled, without the artificial addition of amygdalin. Besides prussic acid and oil of bitter almonds, there is also formed sugar, which may be decomposed by fermentation. The solution, after the termination of the fermenting process, affords a strong acid re-action, which is not produced by acetic, or any other volatile acid. When alcohol is added, and the solution concentrated, thick white flocks are precipitated, which obviously contain no emulsin, because, when dissolved in water, they have no action upon amygdalin. From these and other properties, the flocks would appear to be gum. The phenomena exhibited in the re-action described, which have been termed *catalytic* by Berzelius, resemble, in a great measure, those which take place in fermentation; and their investigation promises to throw great light upon some of the most important processes of the vegetable and animal economy. With the view of assisting in the elucidation of the subject, we have commenced with the examination of the essential ingredients of the milk of sweet almonds, which has been termed *emulsin*. The process by which we obtained this substance, was as follows:—sweet almonds were triturated in a mortar, and small portions of water were gradually added, until a milky fluid was obtained. This fluid was mixed with four times its volume of ether, and frequently agitated so as to effect an intimate mixture. A clear fluid gradually separated at the bottom of the stoppered bottle in which the experiment was made, and which, at the end of three weeks, was drawn off by means of a syphon. This fluid was passed through a filter; and to one-half of the clear solution, a large quantity of alcohol was added, which produced a copious decomposition of white flocks, which were *emulsin*. From the other half, the emulsin was separated by bringing the solution to the boiling point, when it precipitated in flocky coagula. The emulsin precipitated by alcohol was carefully washed with the same fluid, and then dried over sulphuric acid in the vacuum of an air pump, to avoid the effects of heat. In this state it possessed the following characters: it is a white powder, destitute of taste, smell, soluble in water, insoluble in alcohol and ether. When submitted to analysis in the usual way, the following results were obtained:—

I. .3485 grs. gave .618 grs. CO_2 and .2445 grs. H_2O.
II. .3625 grs. gave .6365 grs. CO_2 and .2505 grs. H_2O.

The relation of the carbon and azote was as 3C :1A. From these results we have then—

	I.		II.
Carbon	49.025	..	48.555
Azote	18.910	..	18.742
Hydrogen	7.788	..	7.677
Oxygen	24.277	..	25.026
	100.000		100.000

The fact of the existence of the substance operated on in the almonds appears to be established by its acting on amygdalin, in the same manner as the milk of almonds alluded to in the commencement of the paper. After numerous trials with various re-agents, its most distinguishing character was elicited by the phenomena exhibited when boiled with barytes. During the whole of the boiling, which was continued for above six hours, ammonia was slowly and continuously disengaged. Through the solution a current of carbonic acid gas was passed, and the whole filtered; the clear solution was evaporated to dryness, and the residual salt, which contained a large quantity of barytes, possessed a strongly bitter taste,—thus leading to the conclusion that emulsin is an *amide;* and that the salt formed by the action of barytes, is a compound of barytes with an acid, which we propose to term *emulsic acid*. From this fact, we are inclined to infer that fibrin, gelatin, casein, &c. are also *amides;* but the careful examination of these bodies will form the subsequent part of our investigation.

'Of Chemical Combinations, produced in virtue of the presence of Bodies which remain to continue the process,' by Mr. Exley.

It has been observed, said Mr. Exley, that in many instances, powerful chemical affinities have been brought into activity by the presence of certain bodies which remain insulated. This Berzelius attributes to a peculiar force, which he calls catalytic force. Several reasons are adduced to show that this catalytic force is but one species of the general effects which occur usually in chemical actions, all of which are modifications of universal gravity arising from circumstances. The actions of this force were illustrated in four instances:—First, said Mr. Exley, a piece of spongy platina, about the size of a pea, is placed before a fine jet of hydrogen: this produces the combination of oxygen and hydrogen, raising the temperature till ignition occurs. To explain this by my general principles, it must be observed that, as in all metals, so especially in platina, because of its great density and atomic weight, the sphere of repulsion is very small. Hence, the ethereal atmospheres of its atoms are very dense, on which account the atoms of other bodies are drawn very nearly into combination, and thus, by its influence, the atoms of oxygen and hydrogen are brought so near together as to effect their union; caloric is given out; this favours the like union of other atoms, till ignition is produced. The effect of a clear surface of platina in causing the combination of a due mixture of oxygen and hydrogen, depends on the same conditions. 2nd. Another example given, was the conversion of starch into sugar, by means of dilute sulphuric acid. 3rd. The conversion of sugar into alcohol. 4th. The conversion of the alcohol into ether, by means by sulphuric acid.

'On a new process for Tanning,' by Mr. William Herapath.

The author assumed that the great cause of obstruction to rapid tanning, is, that the weakened ooze is retained by the capillary attraction of the fibres and blood vessels so long, that when it shall have passed out by exosmosis, it will have produced the same effect upon the soluble gelatin as is produced by maceration. Hydraulic pressure was too expensive to obviate this difficulty, and he accordingly thought of employing pressure by the roller. When 100 hides are to be tanned per week, it is necessary to have eight pits, over each of which should be affixed a pair of rollers, the upper ones to be loaded by weights fixed on two levers. For each pit, fifty hides or butts would be made into an endless band by ligatures of twine. Upon introducing each band between a pair of rollers, each hide would be in succession pulled from the bottom of the pit, squeezed by the rollers, and then returned again into the pit for a fresh supply of tanning liquor. Each liquor becomes exhausted about two degrees of the barktrometer in twenty-four hours, when it is pumped to the next pit backwards of the series; and by the time it arrives at the last pit (eight days), it will have lost from sixteen to twenty degrees by the same instrument. The eight pairs of rollers require one horse-power to work them, and two boys, at 2*s.* 6*d.* a week each, to superintend them, when two bands, or 100 hides, will be taken off weekly. We believe a patent has been taken out for this process.

Mr. Maugham exhibited an apparatus which he has employed in attempting to liquefy hydrogen and oxygen. It consists of a strong bent glass tube, having two platinum cones passing in at each end. Water being placed in the tube, and the latter being closed, the wires are to be connected with a sustaining voltaic battery. The water is decomposed, and the liberated gases, hydrogen and oxygen, are retained in a separate state at each end of the tube. By this method, an unlimited extent of atmospheric pressure is obtained upon the enclosed gases.

A paper was next read, 'On the best method of promoting the Absorption of Muriatic Acid, by Water.'

'On the application of Gas obtained from Water to the Manufacture of Iron,' by Mr. J. S. Dawes.

The method of application is as follows:—Jets of steam are made to pass through red hot cast-iron pipes, filled with small coke or charcoal, (the riddlings from the coke-hearth answer every purpose, and are of little value); decomposition immediately takes place; the base of the carbon of the coke combines with the oxygen base of the steam, forming, in the first instance, carbonic acid, but, by passing this over a further portion of the red hot carbon, it is converted into carbonic oxide, sensible heat at the same time becoming latent on combining with the hydrogen base, producing hydrogen gas, which, together with the oxide before mentioned, is applied to the furnace by means of a jet inserted within the blast-pipe tuyere, the pressure upon the gas, of course, being equal to that upon the blast. The pipes re-

quire to be replenished with the brays about every twelve hours, which is conveniently effected by means of a plug fitted to the top of each of them. At first, some difficulty arose from destruction of the pipes, but as the melting point of cast-iron is so much higher than the temperature required to decompose water, it was presumed that the cause of the mischief lay in the construction of the heating furnace; this has been remedied, and the apparatus seems now to be very durable. The present one, at Oldbury, has been in operation for several months, and the pipes are apparently little the worse for wear. The quantity of fuel required to keep them hot, is from twelve to fifteen cwt. of small coal for twelve hours; and as the steam is obtained from the engine-boilers, and the fireman of the hot air apparatus has time enough to attend to it, the expense, with the exception of wear and tear, is comparatively trifling; and as this also, in every probability, will be very moderate, it may be concluded that the cost will not exceed three or four shillings per 1000 feet.

A description, by Prof. Miller, was then read, 'Of an improvement in the construction of the Reflective Goniometer, by which it is rendered more portable.'

In the goniometer exhibited, the milled head, by which the graduated circle is turned, is brought closer to the circle than in the ordinary construction. The branch which carries the crystal, is not in one piece with the axle of the circle, but screws into it. A part of the case of the instrument, which is provided with three adjustable foot screws, by means of which the axis of the goniometer may be rendered horizontal, serves as a stand. The instrument is provided with two verniers, in order to eliminate the error arising from the excentricity of the circle, and with a plane reflector, for the purpose of obtaining for the lower signal an object seen by reflection, as suggested by Degen, in 'Poggendorff's Annalen for 1833,' vol. 27, page 687. The whole packs into a case 5½ inches long, a little less than 5 inches wide, and 1¾ inches thick; or into one third of the space occupied by the case of a goniometer, having a circle of the same size, of the ordinary construction.

Friday.

'On Galactin,' by Thomas Thomson, M.D.

This is a substance which constitutes the principal ingredient in the sap of the Cow-tree, or *Galactodendron utile* of South America, which is used as a substitute for cream. The sap, on standing, throws up a white matter, soluble in boiling alcohol, but deposited as that liquid cools. When well washed and dried, in vacuo, over sulphuric acid, it constitutes galactin. It is yellow, translucent, brittle, has a resinous aspect, and is tasteless. It is insoluble in water, but becomes white and soft by imbibing that liquid. It is soluble in alcohol and ether. This white compound becomes soft and ductile at 60°; at 117° it is still solid, but at 137° it is liquid. Abundance of aqueous vapour is driven off, but the galactin does not become translucent and yellow till kept some time at 170°. The specific gravity of pure galactin is 0.969. It dissolves readily in oil of turpentine and olive oil. It does not combine with potash, nor form a soap. Its constituents are—

6 atoms carbon	=4.5, or per cent.	72	
6 .... hydrogen	=0.75	12	
1 .... oxygen	=1	16	
	6.25	100	

being isomeric with Brazil wax, which does not, according to Mr. Brande, form a soap with potash.

The Secretary (Prof. Miller) read a paper on, and exhibited a drawing of, Lieut. Morrison's instrument for measuring the Electricity of the Atmosphere.—Another, by Mr. J. C. Blackwell, on the formation of crystals of silver, by the contact of brass with nitrate of silver.

Prof. Johnston then read a paper 'On the Resin of Gamboge and its Salts.' He also produced some specimens of resinous substances found in coal mines, and expressed his belief that this resin was an exudation from the trees of which the coal was composed.

Dr. Bird stated that he had formed chloride of copper by the voltaic action.

Mr. Maugham read a paper 'On a new compound of Carbon and Hydrogen.' When the electrodes of a voltaic battery are armed with charcoal points, by means of platinum wires, and then brought under water, so as to produce the spark in the ordinary way, neither hydrogen nor oxygen gases are evolved, but carbonic oxide passes off, and a compound, not previously noticed, remains in the water, consisting of carbon and hydrogen.

The Secretary then read a letter from Prof. Hare, of Philadelphia, 'On the Fusion of Platinum,' [see last year's Report, No. 517,] from which the following is an extract:—

"I have, by improvements in my process for fusing platina, succeeded in reducing twenty-five ounces of that metal to a state so liquid, that the containing cavity not being sufficiently capacious, about two ounces overflowed it, leaving a mass of twenty-three ounces. I see no difficulty in extending the power of my apparatus to the fusion of much larger masses."

Mr. Maugham claimed this mode of fusing platinum as his discovery, and stated that the apparatus was invented by himself, and purchased by Dr. Hare in London.—(See, in reference to this subject, Dr. Hare's letter in Report above referred to).

Section C.—Geology and Geography.

Thursday.

The first paper read was, by Dr. Daubeny 'On the Geology and Thermal Springs of North America.'

The facts which he was about to detail, Dr. Daubeny said he had become possessed of, partly from his own researches during a late visit, and partly through the kindness of the Messrs. Rogers, to whose labours in American geology he paid a just tribute of approbation. The eastern ridge of the Alleghanies, called the Blue ridge, is primary; it bifurcates in Virginia, sending off one branch through the N.E. states, as far as Quebec, and another to the west as far as Kingston in Upper Canada. The low country between these two branches called the Apalachian Valley, is composed of the older limestones. From Upper Canada the western bifurcation ranges round to the N.W. and joins the Rocky Mountains, the great axis of which is also believed to be primary, and which range S. E. to join the Mexican chain. The western Alleghanies are secondary, and most probably the Silurian strata are there fully developed. Beyond the Mississippi, about 200 miles, a range of quartz-rock runs southward into Arkansas, and thus that great river is surrounded on the N.E. & W. by primary ridges. There is a great anticlinal axis in the Alleghanies, but it has no connexion whatever with the primary chain, against which the secondary rocks abut. There are great coal beds in the Mississippi valley, the coal being bituminous, while that on the eastern side of the country is entirely anthracitic. A great tertiary deposit occurs along the eastern shores, the inland limit of which is a cliff of primary rock 200 to 300 feet high, running for a long distance parallel to the Atlantic shores. This barrier forms the head of the navigation, and here all the great cities are placed. He examined groups of thermal springs in various and remote parts of the country; and he stated briefly as the general result, that they gush out in all instances along lines of fracture of the strata: he had already established a similar result respecting the thermal waters of Europe.

Prof. Sedgwick said a few words on the age of the American formations, and commended the philosophic caution shown by American geologists at present, in abstaining from a hasty identification of these rocks with those of England. Dr. Buckland communicated the contents of a letter from Mr. Lea, stating, that the quantity of coal in the valley of the Mississippi was vastly greater than has been hitherto supposed.

The next paper read was, 'On the structure of Fossil Teeth,' by Mr. Owen. (See *ante*, p. 633.) The internal organization of the teeth in the higher mammalia, as shown by magnified transverse sections, was first described. The curious modifications which this structure undergoes in the Megatherium, the Ichthyosaurus, and fossil fishes, were pointed out in detail, and illustrated by numerous magnified drawings. It would be impossible to give the details, but the general result of the investigations is a most important one to geologists, namely, that the different genera may be distinguished by the internal structure of their teeth alone; and therefore, when other characters fail, or a complete tooth is unattainable, generic, nay, perhaps even specific identity, may be established by merely obtaining a thin slice of one of these fossil teeth.

Dr. Buckland communicated a short notice by Sir D. Brewster, of a similar structure in the tooth of the Megalichthys from Fifeshire.

The next communication was, 'An account by Dr. Buckland, of Footsteps on Sandstone near Liverpool.'

This interesting discovery was made in a quarry on the summit of the peninsula between the Dee and Mersey, at a considerable depth from the surface, by two intelligent persons, Forrester and Horne, connected with the quarry; and an account of the circumstances was drawn up by Messrs. Cunningham and Dwyer on the spot. The specimens found, of which beautiful drawings had been taken, were casts of the impression of the foot, and nothing could be more perfect and characteristic. There are two sets of footsteps; one set being those of an animal of which traces have been before observed, and which has been called Cheirotherium, from its hand-like foot: the other, those of smaller animals, which seem to have been land tortoises, similar to those which have been long known in the Dumfries quarries, and which are fully described in Dr. Buckland's Bridgewater Treatise. A space of between twenty and thirty feet horizontal, is exposed in the quarry on which these footsteps are distinctly seen, and where the animals do not appear to have been walking in the ordinary way, but to have been performing gambols. He stated also that from the appearance of the surface of the sandstone, covered with minute spherical elevations quite different from any ripple mark, it was manifest that a shower of rain had fallen, and its traces had been preserved upon this primæval surface.

'On the Antiquity of Organic Remains,' by the Rev. G. Young.

The object was to show, that the generalizations of geologists respecting the high antiquity of certain strata were hastily formed; that much less time was necessary than is commonly supposed, for the production of entire formations; and, that one condition of the earth in respect of climate, is all that is required to explain the phenomena, instead of a succession of such changes, as is generally supposed.

Prof Sedgwick replied, and gave a masterly sketch of the evidence on which geologists have arrived at the conclusions referred to.

Dr. Buckland then read a paper, 'On the application of Small Coal to Economical Purposes.'

He referred to the well known enormous annual waste of coal at the mouths of the various pits near Newcastle; and that, in consequence of what has been said on the subject in his Bridgewater Treatise, the attention of a benevolent individual had been called strongly to the subject. That individual had succeeded in agglutinating the small particles of coal into a firm mass by a process at once simple and cheap; and he believed he had taken out a patent for the method. The individual was Mr. Oram. There would be even an economy in using this coal for many purposes, as it occupied one-third or one-fourth less space, when packed in boxes, than coal in its ordinary state. Specimens were exhibited, which had a firm compact appearance; and Dr. Buckland stated, that, by the directions of government, trials had been made under the inspection of competent persons, and that success had been complete, the combustion being at least as productive as that of coal in its common state.

Prof. Sedgwick read extracts from a statistical return by Mr. Wharton, which went to show that the waste at the pits' mouths, particularly at Hetton and other great collieries, was much less than is commonly imagined, and indeed insignificant. To which Mr. Buddle replied, by stating, that the great waste was underground. A vast quantity of coal was thrown aside as useless, and never saw the light.

A letter was then read from Mr. Fox, of Cornwall, stating, the important fact, as a result of some new and most careful experiments, that he had at length obtained, by voltaic action upon mineral substances, a mineral vein, namely carbonate of zinc, in its natural position between two layers of earthy matter. Pounded killas, with a little sea water, was interposed in an earthenware trough between the

two metallic plates, and a vein of carbonate of zinc, containing a considerable quantity of carbonate of iron, was found, after eight months, to be interposed between the horizontal laminæ of the schistose rock, which adhered so firmly to the sides of the trough, that the latter was obliged to be broken before the schist could be removed. He considered this by far the most important result he had yet obtained.

Mr. D. Milne then read a paper 'On the Berwick and North Durham Coal-field.'

This coal-field consists of the usual alternations. It is of a basin shape, and is about fifteen miles in diameter. There are fifteen seams of coal, of the average thickness of from two to three feet. Limestones are intercalated in the middle, having coal both above and below. Old red sandstone rises from below the basin, and rests on greywacke. The fossils consist of plants, zoophytes, fish and coprolites. The trap dikes and faults, of which there are many, were then described; they present phenomena very analogous to those in a former paper read by Mr. Buddle. The author concluded with some theoretical views respecting the origin of this great deposit.

Mr. Buddle stated, that this coal-field was the one to which he had formerly referred, as containing the coal below the millstone grit, and associated with the carboniferous limestone.

Dr. Buckland directed attention to a specimen of fossil wood, shown by Mr. Milne, into which, when living, a modiola, now attached, appeared to have bored.

Section D.—Zoology and Botany.

Thursday.

The President introduced to the Section Prof. Ehrenberg, whose zeal in the prosecution of microscopical inquiries relative to the organization of the lower animals, has so powerfully contributed to the advancement of our knowledge in that department of Natural History.

Prof. Ehrenberg addressed the meeting at some length, in French: he stated that he had the honour of exhibiting before the Section the first volume of his great work on microscopic forms of life,—a work which, he observed, he should never complete, as the subject was inexhaustible, but that he should continue to extend it, as far as opportunity would allow. After explaining many of the subjects represented in the engravings, he submitted to the inspection of the members present a bottle of the material, collected in considerable quantity in the vicinity of Lake Lettnaggajön, in Sweden, to which the inhabitants of the district give the name of *Bergmehl*, or mountain meal. This earth, which resembles fine flour, has long been celebrated for its nutritious qualities, and was found, on examination, to be entirely composed of the shells of microscopic animalcules.—Prof. Rymer Jones gladly embraced the opportunity, which the presence of that eminent foreigner afforded, to discuss, with Prof. Ehrenberg, some points of great importance, connected with his published opinions concerning the structure of the polygastric infusoria. Prof. Jones observed that he had for some time assiduously devoted himself to the examination of these creatures, and although he fully conceded the accuracy of Prof. Ehrenberg's descriptions of their outward form and general habits, he was disposed to differ from him in opinion concerning their internal structure, more especially as regarded the nature of their digestive organs. He had never been able to perceive the slightest trace of the internal central canal described by Prof. Ehrenberg, or of the branches derived therefrom, which communicate with the sacculi denominated stomachs. He had never seen animalcules, when swallowed by larger species, conveyed at once into the vesicles in which digestion is said to be accomplished; and, moreover, was quite convinced, from numerous observations, that in *Paramecium Aurelia* and other species he had observed the gastric sacculi moving in distinct currents quite round the body of the animalcule—a fact which, in itself, appeared incompatible with the arrangement indicated by the distinguished stranger whom he had the pleasure of addressing.—Prof. Ehrenberg, in reply, observed that it was extremely difficult to see the central tube alluded to; that it was only by watching the course of large pieces of food that he had been able to trace it. The *Paramecium aurelia* was not one of the examples best adapted for the examination of the gastric vesicles, which he believed to be digestive cavities capable of great dilatation; and moreover he had witnessed the expulsion of a kind of exuvium apparently thrown off from their interior: he believed the process of multiplication by division to be merely the developement of a gemma or bud, a view which would much simplify our ideas concerning that singular mode of propagation.

Dr. Parnell exhibited to the Section a dish of white bait (*Clupea alba*) which had been caught in the Frith of Forth. His statement was confirmed by Mr. Yarrell, and other ichthyologists, and thus proves the erroneousness of the assertion that this fish existed only in the Thames.

The Rev. L. Jenyns exhibited a series of specimens of the square-tailed shrew (*Sorex tetragonurus*, Herm.), and pointed out the distinguishing characters between it and the common shrew (*S. rusticus*, Jen.). He also exhibited a specimen of the chestnut shrew (*S. castaneus*, Jen.), which he had formerly considered as a mere variety of the *S. tetragonurus*, but of which he had now seen three individuals, and which he was satisfied deserved to rank as a distinct species. It is principally characterized by the bright chestnut colour of the upper parts; though there are other differences in the tail and in the form of the cranium. It was observed, generally, that the characters of the cranium were found of great assistance in determining the several species of this genus.

Mr. Gray made some observations on the Boring of Pholades.

He stated that there was a difference as to whether the action of these animals in excavating the rocks in which they were found was chemical or mechanical. At one time he was inclined to think it was the former: however, he had lately an opportunity of remarking the action of these animals in the chalk at Brighton, and he now believed it to be mechanical. He then exhibited several specimens of chalk which had been bored by the pholas, and pointed out some circular grooves which were made in their interior by spines on the outside of the shell, as well as a central impression produced by an elongation of the shell to a point at its inferior surface. He stated that the animal did not occupy the whole of the cavity it made, but the upper part only. Why he had formerly supposed the action of these animals on the rocks to be chemical, was, that the *patella* was known to bore; and this would be impossible by the action of its flat shell. There was a little annelide, called Diplotis, which made elongated cavities in rocks. Now this animal had no shell, and its action must, of course, be chemical.—Mr. Mack, of Newcastle, remarked that, with regard to pholades, he had had some in his possession, by which he had an opportunity of observing them both.—Mr. Alder thought there were two kinds of rock-borers—chemical and mechanical. To the latter belonged pholas, teredo, &c. He had observed that all the rocks which these animals bored were soft under water, and did not become hard till they were exposed. He then pointed out the structure of the shells of Pholas, &c. that enabled them to bore. *Saxicava rugosa* had not this structure, and was, probably, a chemical borer; *Venerupis perforans* was supposed to be a borer, but he believed it only occupied the deserted tenements of the pholades.

Sir William Jardine read the report, drawn up at the request of the Association, 'On the present state of our knowledge of the Salmonidæ of Scotland.'

He commenced by observing, that, as a whole, Scotland was decidedly an alpine country, a limited portion only being sub-alpine. It is thus everywhere traversed by streams and rivers, and thickly studded with lakes or lochs, the genera and family of the fishes inhabiting them being almost exclusively Salmonidæ. In the south of Europe, this family is almost lost, the Cyprinidæ prevailing; and only in alpine or sub-alpine districts, as Switzerland, do we find the Salmonidæ existing in abundance. To this family are added, in these districts, the genus Coregonus. In this island, we find the Cyprini prevailing in the south, gradually decreasing, and being supplanted by the Salmonidæ, as we proceed through the northern counties—the pike and the perch alone extending to the middle highlands of Scotland. Before the time of Willoughby, little was known of the species of Salmo and Coregonus, nor did Pennant add greatly to the previous knowledge of them. It is only since the salmon has become an object of commercial importance, that the group has been much studied. The great difficulty which presents itself in studying these fish, is the varying character they present at different stages of their growth. On this account, we cannot reconcile the character of our own fish with those of the continent, nor can we be sure that all our own species are distinct. In fact, it is, at present, almost a question as to what is the true salmon—the *Salmo salar* of Linnæus. The inquiries of Sir William had been chiefly directed to the history of the common salmon, under the following heads:—1. The habits of the salmon in the sea. 2. The food of the salmon in the sea. 3. The breeding, economy, and growth.—1. They are *seldom seen* far out at sea, and are caught near the shore in the highest condition, remaining some time in the mouths of the rivers before they make their final run. 2. They feed on insects, worms, crustacea, &c. This has, however, been doubted by Dr. Knox, who, because he has found, in some instances, the ova of Echinodermata and Crustacea in the stomachs of salmon, contends this is the food they live on. This opinion has now been satisfactorily disproved by the reporter and Mr. Stark, of Edinburgh, the latter of whom has collected the most conclusive evidence in support of his views. There are some points in this question yet to be determined; but the whole structure and habits of the salmon would lead us to suppose that they were formed for capturing prey of a more difficult kind to seize than the ova of Echinodermata, &c. 3. Its breeding and growth are of great importance. The fact of its migrating to fresh water for spawning, is well known, which it does from October to the end of January. The mode of depositing the ova, whether both sexes assist, what depth they are deposited in the sand, how the holes are excavated, are still questions of difficulty, and have not been satisfactorily answered. About the end of March or April, the young are hatched, and, when excluded, are about an inch in length. From this time to May, they were *supposed* to increase from four to six inches, and then to migrate to the sea, from whence they returned in July, weighing from three to eleven pounds, and spawning the following winter. This rapid growth of the fish has now been satisfactorily proved; but Mr. Shaw, of Dumlaury, by keeping the fish in artificial ponds, has come to the conclusion, that the young salmon do not migrate the first year, increasing only in size at the rate of about three inches, and reaching to the usual size and dress of the *fry* only by the second May after exclusion from the ova. Mr. Shaw states also, that during this gradual growth, the colour and markings were those of *parrs*, which was changed as the time of migration approached. The reporter stated, that this latter part of Mr. Shaw's statement he could in part confirm, as he had caught some parrs, and having enclosed them, found them beginning to change their colour and appearance; and, looking at all the circumstances, he must come near to the conclusion, "that a portion of the fishes known under the provincial name of parr are the young of some migratory salmon; and that the time after exclusion from the ova, until arriving at their migratory dress, is longer than what has been hitherto asserted." In the above statement, Sir William used the name of parr as it is popularly applied; the true parr of ichthyologists being the *Salmo salmulus*, which is very different from the young of the common trout. The true parr decreases as we proceed northwards. Although at present little is known of this fish, still there is no doubt of its claim to being considered a distinct species. Of the other migratory trout, from two to five species are enumerated by British authors, Yarrell, Jenyns, and Parnell making but two; the last, including under *Salmo eriox* the *Trutta salmonata*, Will., gives seven varieties, and under *S. trutta* places the *S. albus* of Fleming. Their geographical distribution is difficult to ascertain: the west coast and Solway Frith are the great locality of *S. trutta*, whilst the east coast produces *T. salmonata*, Will. Of the common trout and char, one abounds in all the rivers and lochs of Scotland—the *S. fario*. The various appearances assumed by this fish, have puzzled ichthyologists, and but one species amongst the numbers of these fish have been distinguished—the *Salmo cæcifer* of Dr. Parnell. Another species has been distinguished by Sir William and Mr. Selby,

which they have called, on account of its habits, *S. ferox*. This *was* confounded with, but is distinct from, the *S. lacustris*, Linn. It is found in England in Ullswater. These may be closely allied to the fish of the continent, but Agassiz has pronounced them as different. The charr cannot be said to be generically distinct from the last. They are not often caught by anglers, on account of their peculiar habits, and are not so well known as the preceding fish. Of the Coregoni there are two species—the one called *C. Willughbii*, by Jardine, and found in one or two of the lochs in the vicinity of Lochmaben, in the southern part of Scotland; the other is found in Loch Lomond. Dr. Parnell thinks that there are two species of this fish, which he proposes to call *C. Lacepedei*, and *C. microcephalus*.

Mr. Yarrell observed, with regard to the food of salmon, he never could get a London fish with any food in its stomach. He supposed it might arise from the animal emptying that viscus immediately after it was caught. He believed the Welsh Coregoni to be different from those figured by Dr. Parnell.—Mr. W. Thompson looked upon *Salmo albus* as the young of *S. trutta*, and the *Salmo umbla*, or charr of Ireland, as the common char.—Sir Francis M'Kenzie then made some observations on the existence of parr in rivers above falls, and was inclined to doubt some of the conclusions of the report, especially those which were founded upon Mr. Shaw's experiments. He thought the artificial situation of the fish in Mr. Shaw's experiments would vitiate his conclusions. He proposed, as an experiment, keeping them by wires in their native rivers.—In answer to this, Dr. Parnell stated, that the parr (*Salmo salmulus*) was a distinct species of trout, and that it had no connexion whatever with the migratory species of salmon. He stated the characters by which it was distinguished from the young salmon, and exhibited a specimen of each, of eight inches in length, taken in the month of May, in the river Tweed. The respects in which the two fish differed are as follows:—The form of the salmon is long and narrow, the snout pointed, and the caudal fin acutely forked; the body of the parr is thick and clumsy, the snout broad and blunt, and the caudal fin much less forked. The operculum of the salmon is beautifully rounded at its posterior margin, with the basal line of union with the sub-operculum much curved; in the parr, this part is rather produced, with the line of union straight. In the salmon, the maxillary is short and narrow; in the parr, it is longer and broader, particularly at the posterior free extremity. The teeth of the salmon are long and fine—when recent, easily bent; those of the parr are shorter and stouter, and resist much greater pressure. In the salmon, the pectoral fin is short, not quite one-seventh part the length of the whole fish, with the fourth ray the longest; the same fin in the parr is long, not quite one-sixth part the length of the whole fish, with the fifth ray the longest, giving a form to the fin totally different from that of the salmon. The pectoral, dorsal, and caudal fins in the salmon are black; those fins in the parr are dusky. The flesh of the salmon is delicate, and pinkish, the bones rather soft, and the coats of the stomach thin and tender; the flesh of the parr is white and firm, the bones stout and hard, and the coats of the stomach and intestines thick and tough. It was also stated by Dr. Parnell, that the parr was not so common a fish as was generally supposed; and that those small fish, from four to five inches in length, found so plentifully in many rivers, commonly known by anglers by the name of parr, were not all of one species, but the young of various species and varieties of migrating trout, in company with the young of the salmon, with the true parr (*S. salmulus*), and different varieties of the common fresh-water trout; all of which, during the autumn and winter months, very much resemble each other in their external appearance. Specimens were, at the same time, exhibited, as illustrations of the above facts.

Mr. Allis, of York, read a paper 'On the Toes of the African Ostrich, and the number of Phalanges in the Toes of other birds.'—His attention was directed to this subject by Dr. Riley, of Bristol, who had stated at one of the meetings of the British Association, that he had found the rudiments of a third toe in the ostrich. Neither in the specimens which he has in the Museum at York, nor in one that he obtained about a month since, for the express purpose of looking for this rudimentary toe, has he been able to discover any thing like this third member of the foot. He further stated, that Cuvier had given the number of the phalanges of the toes wrong in the following birds. In the Cassowary, which had three toes, the real numbers are 3, 4, and 5. In the Ostrich 4, and 5. The Caprimulgus has the outer and middle toe, having 4 phalanges each. The Swift has only three phalanges, except in the hallux. The Humming-bird has the full number of phalanges in all its toes.

Mr. Trevelyan exhibited a young living specimen from Rome, of the *Coluber natrix* of Italian authors, but evidently differing from the English species; also a specimen in spirits of *Polyodon folium* of North America; a small collection of Neapolitan insects, and specimens, gathered by him in the island of Elba in 1837, of an *Urtica*, probably an undescribed species.

Dr. Charlton exhibited a specimen of *Tetrao Rakkelhan*, of Temminck, and read a short notice, to prove that this bird, though described as a distinct species, by so great an authority as Temminck, was in fact nothing but a hybrid, between the hen capercailzie and blackcock. This he acknowledged to be an old theory, but it was also held by the greatest living naturalist of Sweden, Prof. Nillson, of Lund. Dr. Charlton brought forward in favour of his opinion the fact, that the female of this bird has never yet been described or discovered, and yet that every year *males* were transmitted to England. Mr. Tunstall, on the authority of some old Scottish gentleman, had stated, that the *hybrid* bird as well as the capercailzie was formerly met with in Scotland. This Dr. Charlton considered as an argument in favour of its being a hybrid, for were it otherwise, it would in all probability, being a much smaller bird, have survived the extirpation of the capercailzie.

SECTION E.—MEDICAL SCIENCE.—THURSDAY.

Previously to the reading of any papers, three recommendations to the General Committee passed the Section: 1st. That a communication should take place with members of the Medico-Chirurgical Society of London, in order that papers read at this Section might be occasionally published in their Transactions. 2nd. That application should be made for a grant of 200*l.* from the funds of the Association, for the purpose of bringing over to this country, and retaining here for one year, Alexis, mentioned by Dr. Beaumont, in his work on Digestion, for the purpose of making physiological and chemical researches on the subject of digestion, in connexion with the Chemical Section. The Committee proposed for the investigation were, Drs. Thompson, Prout, and Graham, and Professor Owen. 3rd. For the appointment of a committee to communicate with previously appointed committees for the purpose of furnishing reports on particular subjects for which pecuniary grants were given. This step was considered necessary, from the fact, that no communication had been received from some of those committees.

Dr. Granville then laid before the Section an improved Stethoscope, the advantages of which were the facility of examining the patient without the necessity of his rising, and also of avoiding the necessity of having the practitioner's head immediately parallel to the part examined; these advantages were effected by the addition of a half ball-and-socket joint attached to the ear-piece, which of course became moveable to a greater or less angle with the cylinder, as circumstances might require.

Dr. Rees read a paper 'On the Chemical Nature of the Liquor Amnii.'

The principal points established were the specific gravity being found lower than the previous statements, being only 1007. As an average of different results, that the fatty matter discovered in it was different from the fatty matter of the blood; and that urea was discovered in every specimen examined.

Dr. Bird observed that this last fact tended to support the generally received opinion of German physiologists,—namely, that the Liquor Amnii was a secretion from the fœtal kidneys.

Mr. Baird detailed a case of successful excision of the elbow joint. The patient was presented to the Section, and considerable motion was shown to exist in the joint; so much so, as to enable him to pursue his ordinary occupation in a glass manufactory.

Dr. R. D. Thomson read a paper 'On the Modus Operandi of Nitrate of Silver as a Caustic and Therapeutic Agent.'

It was stated that light had no power whatever in decomposing nitrate of silver. In every instance in which this apparently occurred, it had been previously rolled in paper, which afforded an opportunity for it to combine with organic matter, and thus produce the effect upon which the general opinion was founded. A specimen of pure nitrate of silver, placed in a tube hermetically sealed, was exposed on the top of a house for a considerable period without the slightest discolouration. The specimen was exhibited. To illustrate the action of nitrate of silver when applied to the skin, or a diseased surface, Dr. T. added a solution of this substance to a solution of white of egg or albumen; he found that two distinct compounds resulted, one soluble, the other insoluble in water. He contended, that these compounds were formed when it was applied to an organized surface, and that, they being removed, the caustic effect was thus produced; and that, in the internal use of this substance, the doses which could be administered in safety were proportioned to the quantity of albuminous matter contained in the stomach; and that in the event of a deficiency, the coats of the stomach would be acted upon in the same manner, and death ensue; but that it was impossible for the substance unchanged to become mixed with the blood, and deposited on the surface, as was generally believed.

Mr. Greenhow read a brief memoir on Fractures, for the purpose of introducing to the Section a model of a new sling fracture bed, applicable to every fracture in the lower extremity, but peculiarly adapted to the treatment of compound fractures of the femur. The following advantages were attainable by the present apparatus:—1st, Ease of position; 2nd, Easy and gradual extension by means of a screw at the termination, beyond the heel of the patient, whose action was connected with the ancle joint and instep; 3rd, Facility of examining and dressing the limb in cases of compound fracture, without disturbing the fractured ends; 4th, The freedom of slight motion enjoyed in such a way as to be of no injury to the process of reparation. Mr. Greenhow detailed some interesting cases treated with this apparatus, demonstrating its peculiar advantages.

SECTION F.—STATISTICS.—THURSDAY.

The Secretary (Mr. Heywood), announced, that he had received from the Rev. Dr. Potter, the last 'Annual Reports of the Regents of the University of the State of New York,' together with the accompanying letter:—

"The Rev. Dr. Potter, of the United States, takes the liberty of transmitting to the Secretary of the Statistical Section of the British Association the last Annual Report of the Regents of the University of the State of New York. Having been present yesterday, a few moments, while the subject of Popular Education was under discussion, and happening to have this document in his possession, he has ventured to offer it as a contribution to the archives of the society. The information which it embodies does not refer immediately to popular education, the higher schools and colleges being the only institutions immediately under the supervision of the Regents. The report, however, may serve to give some idea of the manner in which the higher seminaries of learning are conducted—by what means they are confederated, so as to form one system—what measures are taken to secure the proper discharge of their duties—and the nature and amount of the patronage extended to them by the State. The Report also contains some information respecting the efforts which are now making, not only in the State of New York, but in many, or, indeed in most of the other States, to improve the character and qualification of common school teachers. In respect of the common schools, the Secretary is doubtless aware that in nearly all the States they are placed by law under the immediate supervision of the Government, and that a large proportion of the expense of maintaining them is discharged by the State Treasury.—In the State of New York, by means of this system, more than nine-tenths of all the children between the ages of five and fifteen are brought into school, and taught the first elements of knowledge. It must be acknowledged, however, that owing in part to the deficient qualification of the teacher, and still more to the indifference of parents, the education imparted in many of these schools is exceedingly imperfect. Of this there is a growing conviction among the people; and this conviction has led to various measures for improving the constitution of our common schools. Among which may be mentioned the establishment of newspapers devoted to the interests of education—the formation of a society to improve the character of school-books, the construction of school-houses, and the qualifications of teachers—and also the exercise, on the part of the State, of greater care in organizing, and greater liberality in supporting the schools. In the State of New York, about one million dollars have been recently appropriated by the Legislature to al-

vance the interests of education. Of this sum seventy-five thousand dollars are set apart for the purpose of placing, in every school district of the State, a small library of useful and popular books, which may circulate among the families of the district.—In general it may be remarked, that there is hardly any topic which, in the United States, excites so general and lively an interest as that of education. There is a growing conviction, that every thing valuable in possession or prospect depends upon the intelligence and virtue of the people, and that no pains or expense should be spared to secure for them the blessings of a more thorough education. It may also be mentioned as an encouraging fact, that the indispensable necessity of combining moral with intellectual training is now generally recognized. All our experience teaches us, that the diminution of crime, and the general improvement of the people, is in direct proportion to the extent with which moral and religious instruction are combined with that which may be termed secular. Hence the remarkable fact, that in several penitentiaries, where an examination has been instituted, no inmate has been found, or at most, but one or two, who had previously enjoyed the benefit of a thorough Sunday school course. This is attributed, not merely to the fact that religion is taught in Sunday schools, but to the fact that, instead of being content, like too many common schools, with teaching children to read, they aim at instilling into the mind *the great principles of truth and duty*: and of so instilling them, that they shall ever afterwards be reverted to with pleasure and gratitude. Apologizing for this intrusion of a stranger upon the notice of the Section, Dr. P. begs leave to express his best wishes for the success of the British Association in all its great and laudable objects.—*Commercial Hotel, Aug. 22, 1838.*"

These valuable Reports were long since brought under the consideration of the public in this paper, (see No. 460), and have often been referred to. Dr. Taylor also presented an analysis of one to the Statistical Section last year, (see No. 516).

The first paper read was, an abstract of the 'Second Report of the Railway Commissioners for Ireland,' by Mr. Rawson.

The Report commences with a general statistical view of Ireland, exhibiting the manner in which the population is distributed and employed—the exports and imports of the country—the amount of the present traffic, and through what channels it is carried—the number of public conveyances throughout Ireland, and the average number of passengers on every road—with the amount of postage received in the different towns. From this information, the Commissioners have deduced the relative importance of different districts, and the commercial activity prevailing in each. The next branch of inquiry related to the nature and fertility of the soil—the productiveness of the different districts—the capabilities of improvements which they possess—and the facilities which they afford for railway communications. The geological structure of the country throws great light upon these questions, and the Report contains a very valuable paper upon this branch of the subject by Mr. Griffith. The Commissioners state their conviction, founded upon the information thus obtained, that the important public objects anticipated from the establishment of railways in Ireland, are not to be accomplished by separate and isolated lines, but by a well combined and judicious system, in which the joint traffic of many places and districts should pass to a great extent over one common line. This principle, under the circumstances above detailed, have guided the Commissioners in selecting the direction of the main trunk lines, which they recommend, and which they consider as the best adapted in the aggregate to give the greatest return on capital; and the Report concludes with recommendations as to the mode in which public aid may be most effectually and economically given to works of this nature, and suggestions as to a general control of railway companies. The first inquiry, it will be observed, relates to the amounts, distribution, and employment of the population. *Amount of the Population.*—The population of Ireland was, in the year

1731	2,010,221		
1791	4,206,602,	rate of increase per annum	1½ per cent.
1821	6,801,827	,, ,,	1 3-5ths.
1831	7,767,401	,, ,,	1½
1834	7,943,960	,, ,,	¾

The population differs exceedingly in social condition, in habits, character, and even in personal appearance. The northern portion are better lodged, clothed, and fed than the others: the wages of labour are higher, being on an average about 1*s.* per day; and their food consists chiefly of meal, potatoes, and milk. They are a frugal, industrious, and intelligent race, inhabiting a district for the most part less fertile than the south of Ireland, but cultivating it better, and paying higher rents in proportion to the quality of the land. In the southern districts the population is in every respects in a worse condition; their habitations are inferior; their food consists at best of potatoes and milk, without meal; their wages are one-third less, or 8*d.* a day; yet the peasantry are a robust, active, and athletic race, capable of great exertions; often exposed to great privations; ignorant, but eager for instruction; and readily trained under judicious management to habits of order and steady industry. The population of the midland districts resembles that of the south; but that of the western district is decidedly inferior to both in condition and appearance. Their food consists of the potato alone, without meal, and in most cases without milk; their cabins are wretched hovels, their beds straw; the wages of labour are reduced to the lowest point, not averaging more than 6*d.* a day. Agriculture is in the rudest and lowest state; a farmer employing labourers and adopting the improved system of modern husbandry, is rarely to be found; the country swarms with small occupiers; labour brings inadequate return; poverty and misery have deprived the people of all energy, and the great mass of them exist in a state bordering upon destitution. Looking then to the numbers, condition, and habits of the people within these four great divisions, and to their relative capabilities of benefiting by an improved system of communication, the Commissioners express their opinion that the first efforts should be directed towards carrying lines of railway from Dublin through the northern and southern districts. The population of the western district is not in a condition to profit equally by such works; but greater good would be effected among them by opening common roads, of which in some parts they are in great want. *Employment of the Population.*—With respect to the employment of the people, it is essentially agricultural; but in the northern districts numbers of the peasantry who occupy and cultivate small portions of land, devote their spare time to the domestic manufacture of linen. The culture of flax, its preparation and manufacture, occupy a considerable portion of the population in the counties of Armagh, Antrim, Down, Tyrone, Londonderry, and part of Monaghan. There are in Belfast and its immediate vicinity 15 mills for spinning linen yarn, and 4 at places not far distant. The largest of these mills employs 800 persons, and its annual consumption of flax is 720 tons. From returns by the Collectors of Customs it appears that the export of linen from Ireland to foreign countries in 1825 was 55,114,512 yards; in 1835 it was 70,209,572;—showing an increase of 15,095,057 yards, or 27 per cent. *Nature and Amount of the present Traffic.*—In default of better sources of information, the Commissioners had recourse to the constabulary force, through whose assistance, together with returns from the Customs, and the officers of the principal canals, and of some of the largest coach and car establishments, an account of the traffic of the principal towns in Ireland has been prepared and represented on a map by Lieut. Harness, R.E. The largest line of internal traffic stretches from Dublin to the westward, along the Grand Canal, joining the Shannon at Shannon Harbour, and extending down that river to Limerick. The Shannon is now navigated for the distance of 150 miles by a number of steam-vessels; and a regular and thriving intercourse is established, by means of the Grand Canal, between Limerick and Liverpool. The quantities of agricultural produce brought from the interior to the several ports of Ireland is estimated at 1,225,000 tons, of which 700,000 tons are for exportation, and the remainder for consumption in the ports. The return, or import trade, is computed at 385,000 tons; there then remain materials for building, fuel, and manure, the supply of which varies greatly with the circumstances of each port. A table accompanied the Report, giving an estimate of the inland traffic to and from the several ports: and the value of the trade of the principal ports in 1835 is shown in the following table, which includes the coasting trade with Great Britain:—

PORTS.	Value of Imports.	Value of Exports.	Total.
Belfast	3,695,437	4,341,794	8,037,231
Dublin	4,430,321	2,528,543	6,958,864
Cork	2,751,694	2,909,846	5,661,530
Waterford	1,274,154	1,821,245	3,095,399
Londonderry	708,054	1,040,918	1,748,972
Newry	568,711	616,836	1,185,547
Limerick	323,740	726,430	1,050,170
Wexford	621,417	312,136	933,553
Drogheda	259,854	766,027	1,025,881
Dundalk	107,953	452,813	560,766
Sligo	124,692	369,490	494,182
Galway	88,268	251,864	340,132
Youghal	28,310	215,316	243,626
All other Ports	354,502	1,041,555	1,396,057
Total	15,337,097	17,394,813	32,731,910

The returns from the Post-office afford another test of commercial activity, and the amount of postage from the 8 most productive counties in 1836 was as follows:—

Dublin	£75,726	Limerick	£9,185
Cork	25,415	Down	8,824
Antrim	16,587	Waterford	7,325
Tipperary	10,845	Tipperary	4,688

These facts show pretty clearly the relative condition and commercial activity of the principal towns and districts of Ireland. The preponderance of Dublin, Cork, Belfast, Limerick, and Waterford, with their surrounding districts, is very great, and establish their claim to be leading points in any system of railway communication. To the westward, the country is provided with two great canals, more than sufficient for its wants in that direction; but to the north of the Royal Canal, and towards Belfast, there exists no great line of communication, except by common roads. A considerable stream of traffic, supplied from Virginia, Kells, and Enniskillen, passes from Navan towards Dublin; while the country approaching Belfast is traversed in every direction by small streams of traffic, strongly indicating the industry, activity, and trading spirit of that important district. In the district north of Dublin, the general direction of the trade is towards the coast. A railway from Dublin, by Navan and Armagh to Belfast, would therefore, in the first part of its course, receive at Navan all the traffic from that town, augmented by contributions from Virginia, Kells, and Enniskillen; it would again fall in at Armagh with the course of trade to and from Belfast: but in the intervening distance it would cross and intersect the stream of traffic flowing towards the coast, and would therefore be of very little service in facilitating and promoting the carrying trade of this part of the country. It is on the conveyance of passengers that this line of railway must rest its chief claim to support as a work of public utility; and in this respect it would possess advantages over almost any other line in Ireland. The state of travelling throughout the country, and the relative amount of passenger traffic on different roads, is an important point for consideration in estimating the comparative eligibility of various lines of railway. The Commissioners have formed an estimate of the traffic and travelling which may reasonably be expected on the railroads. It is as follows:—

	Miles.	Average number of Passengers moved over every Mile daily.	Average number of Tons moved over every Mile daily.	Average Daily Receipts. Passengers at 1½*d.* per head per Mile.	Average Daily Receipts. Goods at 2*d.* per Ton per Mile.	Total Daily Receipt for Passengers and Goods.
South Western Line to Cork, with branches to Limerick and Kilkenny	288¾	342	87.37	£. *s.* *d.* 407 18 11	£. *s.* *d.* 167 9 10	£. *s.* *d.* 575 8 9
Northern Line, through Armagh to Belfast	121¾	456	67.41	288 10 5	56 16 7	345 6 0

The precise course of the proposed lines of railway has necessarily been in a great measure determined by the features and conformation of the country. The Commissioners have come to the conclusion that these two main lines, with the branches described, will confer the most extensive accommodation at the least expense, and afford the greatest return on capital. The results of the engineer's surveys on the southern line are very favourable. The point selected for the Dublin terminus is on the bank of the river Liffey, close to Barrack-bridge, and 1½ mile from the Post-office. The line, as laid down, runs in a southern direction on the right bank of the Liffey, through Palmerstown and close to Lucan,

Thence it continues in a south-west direction, passing near to the towns of Sallins, Rathangan, Monasterevan, Portarlington, and Maryborough. Three miles beyond the latter place, it is proposed to commence the branch to Kilkenny, by the towns of Abbeleix and Ballyragget. The distance between Dublin, and the commencement of this branch is 52¼ miles, and thence to Kilkenny is 26¼ miles, making the total distance from Dublin to Kilkenny 79 miles. From Maryborough the main line proceeds to within 3 miles of Borris-in-Ossory, where it will receive the passengers and merchandise, from the towns of Borris-in-Ossory, Roscrea, Castletown, Mountrath, and the surrounding districts. It is also probable that passengers from Galway, Loughrea, and the southern part of the county of Galway, with those from Parsonstown and its neighbourhood in the King's County, will join the railway at this station. From Borris-in-Ossory, the line continues in the same direction near Rathdowney, Templemore, and Thurles to Holycross, where the line to Limerick diverges. The distance from Dublin to Holycross is 89¾ miles, thence to Limerick 35¾ miles, making the total distance to Limerick 125½ miles. From Holycross the main Cork line proceeds in a southerly direction to Cashel, and thence to Marhill, near New Inn, in the county of Tipperary, at which point it is intended that the line to Clonmel and Waterford should commence. But, in order to complete a direct railway communication between Limerick and Waterford, it is proposed that this branch line should be continued in a western direction, from Marhill towards Limerick, crossing the river Suir at Golden, and joining the line from Holycross to Limerick at Donaghill. The distance from Marhill to Donaghill will be 13 miles. The distance from Dublin to Marhill is 104¼ miles, and from the latter place to Waterford 37 miles. From Marhill the Cork line follows the valley of the river Suir to Cahir, passes through the narrow valley interposed between the Galltees and Kilworth mountains, whence it continues by Mitchelstown to Kildorrery, and thence to the town of Mallow. The valley of the Blackwater, at Mallow, offers a very favourable line for the extension of the railway at some future period to Killarney, which is only 40 miles distant. This line would open a space of great resort to visitors, and would connect the extensive culm collieries, near the Blackwater, with the interior of the limestone country, where fuel, and particularly culm, is much wanted for burning lime, both for building and agriculture. From Mallow the line takes a southern direction to Cork. Several other surveys of a less important character had likewise been made to connect inland towns with the coast; the greater number of which were intended for tram-roads, to be worked by horses. One of these extended from Drogheda to Longford, through Navan and Kells; a second from Dundalk to Cavan, through Castleblaney and Cootehill; and a third from Portrush, on the north coast of Antrim, to Armagh, through Coleraine and Kilrea. With these surveys before them, and weighing the natural difficulties of the country, the Commissioners, after proper surveys were made, determined that the best lines for internal communication to the north and north-east of Ireland, ran through Navan, Carrickmacross, and Castleblaney to Armagh, and through Navan, Kells, Virginia, and Cavan to Enniskillen. An Act of Parliament having been obtained for a railway between Armagh and Belfast, the Commissioners adopted the line as the continuation and completion of their main line to the latter town. The Commissioners consider that, in Ireland, 10,000*l.* to 12,000*l.* per mile may be generally made to cover all the charges of the construction and appointments of a railway. They estimate the annual expense of working each engine at 1750*l.* per annum, and the carriage, and other expenses attending the locomotive, at 875*l.*; the remaining expenses of a line they calculated at as much more, 2625*l.*; making the whole expense per engine 5250*l.* The medium day's journey of an engine may be estimated at 80 miles; therefore assuming a charge of 2*d.* per ton, and excluding Sundays, the expense of working an engine will be covered by its carrying through the whole distance a net load of 25 tons: all that it takes beyond this will be applicable towards a dividend on the capital expended. The Commissioners estimate the expenses of constructing the south-western main line with its branches as follows:—

Main line, 166½ miles, at 11,000*l.* per mile ...	£1,831,500
Kilkenny Branch, 26½ miles, at 8000*l.* per mile	212,000
Limerick „ 35¾ „ at „ „	286,000
Total cost of construction	£2,329,500

The total surplus revenue is estimated at 82,137*l.*, which would yield a dividend on the above capital of about 3½ per cent. The cost of the Waterford and Limerick branch from the former town to Donaghill, where it joins the Limerick branch, is estimated at 400,000*l.*, being 50 miles, at 8000*l.* a mile. The surplus revenue is calculated at 15,000*l.* per annum, which would yield a dividend of 3.8 per cent. The cost of the northern lines, according to Mr. Macneil's Report, is as follows:—

From Dublin to Navan	£257,512
Navan to Armagh	777,595
Navan to Enniskillen	865,218
	£1,900,326
Stations and Carrying Establishments....	114,720
Total cost	£2,015,146

According to the estimate of the Commissioners the whole annual receipt on these two lines will be 126,106*l.*, which will yield a dividend of 4.32 per cent. if the construction cost 12,000*l.* a mile; and 5.18 per cent. if it cost 10,000*l.* a mile; the mean being 4.75 per cent. at 11,000*l.* per mile. All the estimates of traffic and passengers have been taken on a very low scale, and there is every reason to expect a considerable increase upon the revenue here stated.

Rates at which it is calculated that the mails may be conveyed from the Post-office in London to that in Dublin, by the construction of the several projected railways:—

English Ports.	Distance from London.	Time by Railway.	Irish Port.	Length of Voyage.	Time on Voyage, including 3 min. for embarking and sailing.	Time from Irish Port to Dublin, including landing.	Whole Time.	Hour of Arrival in Dublin.	Hour of Departure from Dublin to London.
	Miles.	H. M.		Stat. Miles.	H. M.	H. M.	H. M.	H. M.	H. M.
Holyhead	272	10 35	Kingstown	63	6 48	30	17 53	1 53 P.M.	11 7 A.M.
Liverpool	210	8 17	Ditto.	130	13 30	30	22 17	6 17 „	6 43 „
Ormes's Bay	230	9 1	Ditto.	96	10 6	30	19 37	3 37 „	9 28 „
Porth-Dynllaen ..	260	10 8	Ditto.	70	7 30	20	18 8	2 8 „	10 52 „
Porth-Dynllaen ..	260	10 8	Wicklow..	60	6 30	1 23½	18 1½	2 1½ „	10 58½ „
Fishguard	260	10 8	Ditto.	79	8 24	3 23½	18 55½	2 55½ „	9 41½ „

One half hour is allowed from the Post Office in London to starting on railway; 27 miles per hour for the railway; 30 minutes from the railway to embark and sail; 10 miles per hour for steam-packet voyage; 2 hours additional for return to London, to allow for occasional long passages by sea. Hour of leaving London 8 P.M.; hour of arrival 7 A.M. The Commissioners conclude their Report with enquiry into the nature and amount of the assistance which should be afforded by the Government towards the prosecution of these undertakings. They show the present anomalous and miserable condition of the Irish peasantry;—they enumerate the advantages which the establishment of railroads would confer upon them, as well as upon the nation at large by the increased revenue which would arise from any improvement in their condition;—they enlarge upon the influence which railways have had elsewhere in developing the resources of a country, as well as the improvements which have been introduced in Ireland itself by the extension of internal communication and by steam communication—and they conclude by recommending an immediate and liberal attention to the claims of Ireland for assistance, which cannot be conferred in any shape more likely to prove beneficial than by encouraging public works of extensive and permanent utility, which will afford the means of present employment of a steady and remunerative nature to a large body of the people, and at the same time lay the foundation of their future improvement and prosperity. It being a very desirable object to combine into one interest, and under one management and control, the whole of the proposed southern lines, and to effect the same for the northern lines; and as it may be found difficult to induce capitalists to undertake the whole of these lines, although they would be willing enough to undertake certain portions which hold out special prospects of advantage, the Commissioners therefore suggest that the Government should advance by way of loan, a considerable proportion of the amount of the estimates, at the lowest rate of interest, and on the easiest terms of repayments, to be secured by a mortgage of the works.

At the conclusion of this paper, Mr. Griffiths exhibited the maps of Ireland, prepared by the Commissioners.

The following Statistical Tables were then exhibited, of the nine principal Collieries in the county of Durham, prepared by Mr. W. L. Wharton.

STATISTICAL TABLES OF THE ENGINES, VENTILATION, SCREENS, AND SALES, &c; AND OF THE PITMEN; AND THE STRATA OF NINE PRINCIPAL COLLIERIES IN THE COUNTY OF DURHAM:

The first eight being situated on the East or "Dip" Side of the Great Durham Coal-field.

	PRINCIPAL PUMPING ENGINES.				WINDING ENGINES.			VENTILATION.	
	Condensing or Non-condensing.	*Double or single, and diam. of cylinder.*	*Length of stroke in pit.*	*Supposed average quantity of water raised, and from what depth.* (1)	*Condensing or non-condensing, and diameter of cylinder.*	*Load upon pit-rope, and time of drawing it.*	*Valves, &c.*	*Greatest length of air courses.* (3)	*Velocity of current.*
				gals. p. min. fath.		cwt. ft. p. sec.			
Manor Wallsend Colliery, dist. 16½ m. (true) N.N.E. from Durham	Con.	50 in. d.	7 ft.	49 80	2 con. 30 and 33 in.	22½ 12	Safety valve.	9½ miles.	From 6 to 10 ft. per sec.
Monkwearmouth Colliery, distant 12½ miles N.E. by N. from ditto	Con.	72 in. d.	8 ft. 4 in.	126 232	1 con. 42 in.	36 13½	Safety valve; Scott's Pat. Coll.	1½ miles.	5 ft. p. sec. in area of 20 ft.
Newbottle Colliery, distant 6½ miles N.E. by N. from ditto	Non-con.	46½ in. d.	6 ft.	36 96	4 con. 30,30,30, &35 in.; 1 non-con. 35 in.	22½ 8	Large extra safety valve.		
Littletown Colliery, distant 3¼ miles E. by N. from .. ditto	Non-con.	55½ in. d. (2)	8 ft.	306 95	2 con. 30 in.; 2 non-con. 30 in.	26 20	Ditto		
Hetton Colliery, dist. 6 m. N.E. by E. from do.	Eppleton	Con.	66 in. d.	5 ft.	156 110	4 con. 30, 38½, 38½, & 38½ in.	33 to 34.3 11 to 16	Safety valve, lead plugs, Scott's Pat. Coll.	fm. 3 to 11¾ m. From 4 to 12½ ft. per sec.
	Hetton..	Con.	78½ in. d.	8 ft. 6 in.	84 180	4 non-con. 24,27,30, & 38½ in.	41.3 16		
South Hetton Colliery, distant 6½ miles E.N.E. from Durham	Con.	84 in. d. (2)	8 ft.	250 30 to 180	2 con. 42 in.	27 18	Safety valves.		
Haswell Colliery, distant 6 miles E. from ..... ditto	Con.	69½ in. d.	7 ft.	300 160	2 non-con. 31 in.	39 18½	Safety valves.	Mea. lgth. 2 m.	15 ft. p. sec. in main cur.
Thornley Colliery, distant 5½ miles E.S.E. from .. ditto	Non-con.	38 in. d.	5 ft.	450 85	2 con. 42 in.; 2 non-con. 29 in.	— 11½	Safety valves and lead plugs.		
Black Boy Colliery, distant 9 miles S. by W. from ditto	Con.	35 in. s.	7 ft.	300 40	1 con. 24 in.; 2 non-con. 14 and 26 in.	15½ 5½	Safety valves; Scott's Pat. Coll.		

SCREENS.

	Distance between Bars.	Small Coal by Screening.	Small Coal consumed by Engines.	Small Coal left unsaleable.	Small Coal in Mine.
Manor Wallsend Colliery	⅜ in.	One-fourth of quantity drawn	3445 tons per annum	None	None .....
Monkwearmouth Colliery	½ in.	One-third ..... do.	85 tons per week	None	.....
Newbottle Colliery ..... / Littletown Colliery	⅜ & ½ in.	One-sixth and one-third do.	52 .... do.	None except dust	None .....
Hetton Colliery	⅜ in.	28 per cent. do.	5 per cent	1½ per cent. (4) ..	5 p. ct., in some cases non
South Hetton Colliery	½ in.	One-fourth to one-third do.	.....	None except dust	None .....
Haswell Colliery	⅜ to ½ in.	29 per cent. do.	10 per ct. of small; remainder sold or used by workmen	Do.	None .....
Thornley (Hartlepool) Colliery	⅜ in.	nearly ¼ (adding refuse)	.....	None except dust, amounting to nearly ½ of *small* c.	.....
Black Boy (Tees W.E.) Colliery	⅛ in.	25 per cent.	60 tons per week	.....	1/200 .....

SALES, &c.

Average shipping prices in 1836-7. (5)	Tons sold in London Coal Market in 1837.	Prices, at Coal Market, May and Sept. 15, 1837.
9s. 9d.	48,005	21s.
9s. 3d., 11s. 6d.	16,768	—
11s. 6d.	166,791	22s. 6d., 24s.
11s. 6d.	204,668 *	22s. 9d., 24s.
11s. 6d.	121,628	22s. 9d., 23s. 9d.
s. 6d.	84,471	22s. 6d., 23s. 9d.
10s. 4d., 6d.	57,774	22s. 6d., 24s.
10s. 9d.	65,563	22s., 23s.

* And also vast quantities abroad, and the towns along the coast.

PITMEN.

	Particular Diseases, and Working Ages.	Average Earnings. (6)	Schools and Places of Religious Worship.	Habitations.
Manor Wallsend	None. Work in the pits from the age of 6 to 60 or 70	4s. per day (11 d. in 14)	Church, Meeting-houses, and several Schools	Comfortable
Monkwearmouth	None. To old age	21s. per week	Ditto	£4 to find house
Newbottle and Littletown	None. Fm. 7 to 70	20s. to 25s. p. wk.; when trade bad, 14s. to 15s. p. wk.	Church, Meeting-houses, and Sunday Schools	House and garden provided
Hetton	None. To 65 or 70	Abt. 3s. 7d. p. day	11 places of worship, and 7 Sunday Schools.—Population 5844	Cottage and garden provided
South Hetton ..	To 60 or 70	Abt. 3s. 6d. p. day	Chapel of Established Church, and Meeting-houses	Good house and garden
Haswell	None. To old age	4s. per day (11 d. in 14)	Meeting-house	Ditto ....
Thornley	None. To 70. they work longer than agricultural labourers	Variable; an *old* man may earn fm. 2s. to 2s. 8d.	Dissenting Chapels; a school established by the proprietors of colliery	.....
Black Boy	Rheumatism. Work to 65	4s. per day	Various places of Worship, 3 Sunday Schools, and 1 Day School, supported by the owners of the colliery	.....

STRATA. (7)

Limestone and Red Sand.	Depth from surface to Main & Hutton Seams, in fathoms.	Their thickness of clean coal, in feet.	Magnetic direction, and angle of dip.	Dir. spring of "back" or "cleat, & headway.	Dykes—their downcast and magnetic bearings.
Fathoms.					
None	95 & 160	4½ & 7	S. 63 W., 1 in 12	S. 12 E.	1 sh., S.E. ke 58 fa.
30 limestone, 2 sand	265 to working seam (9)	 6	Uncert.	S. from 10 to 20 E.	1 W. Strata dislocated; W., N., and
None	96 & 130½	6½ & 4½	S. 55 E., 1 in 54	S. 14 E. High ma. S. 85 E. Hutton s.	Slip dyke 21 fa. N.; S. 80½ E.
Hetton.. 26½ limestone, no sand	109 & 147½	4½ & 4½	E.—1 in 23	S.	Sev. slip dykes, fm. 5 to 12 fath. mostly E. & W.
Eppleton 9½ limestone, 18½ yellow sand	148 & 174½				
46 limestone, 5 sand	140 & 180	6½ & 4½	E. 1 in 23	Indistinct cleat in Hutton sm.	Inconsiderable.
46½ limestone, 8 inches red sandstone	106½ & 152½	2½ & 4½	E.—1 in 24	S. 45 E.	Whin dyke, N. 80 W.
25 limestone, 6 red sandstone	101 & 105	.... 3½	S.E.	Varies	Largest slip dyke 6 fathoms
.....	50 & —	5 & —	S. 21 E.	S.E.	Slip dyke, 3½ fathoms.

These Tables have been chiefly drawn from information furnished by the principal Agents of each Colliery. The Prices, Sales, &c., are taken from the recently published Parliamentary Report of the London Coal Trade Committee.

(1) The largest feeders are encountered in sinking the shafts, (amounting occasionally to 2000 or 3000 gals. per minute,) and are afterwards "stopped back" by a metal case ("tubbing") fitted to the shaft. The *lowest* feeders of the Monkwearmouth and Manor Wallsend collieries are *salt*. Some copious and valuable salt springs also rise out of the sides of slip and whin dykes in other parts of the county.

(2) These are probably the most powerful non-condensing and condensing engines ever erected. There are, however, several *single* pumping engines in Cornwall, furnished with larger cylinders, (3 of 85 in. and 3 of 90 in. diam.,) the "duty" of which (estimated by the number of lb. lifted 1 foot high, by the consumption of 1 bushel of coals,) far exceeds the performance of any engines in this district, and in 1 engine amounts to above 80,000,000 lb. !!

(3) A Davy lamp, in good order, is supposed by the agents of all these collieries to afford perfect security against fire damp. The workings of the deepest collieries are frequently carried to an amazing extent *from one shaft*. Several thousand acres of coal are generally held under lease by the proprietors of the largest collieries, the rent being compounded of a "certain" annual rent, and an additional "ten tail" rent for each ten of coals (=18½ Newcastle chaldrons of 53 cwt.) sold beyond the quantity stipulated for the "certain" rent. These ten tail rents are mostly between 14s. and 24s. per ten, according to the value of the seams and difficulty of reaching them. The capital required for the establishment of a first-rate, sea-sale colliery, including winning, machinery, houses, waggons, &c. is very large, (from 50,000*l.* to upwards of 150,000*l.*)

(4) "Of the remaining 21½ per cent. of small coal, 2 per cent. is consumed by the colliery workmen, and 19½ per cent. sold."

(5) The corresponding prices of coal of inferior quality were from 6s. 6d. upwards to those given above, which were the highest reported in 1836-7. The corresponding prices and sales of three of the largest Northumberland collieries, were Killingworth 11s. 6d... 82,699 tons..21s. Bewick & Co.'s 10s. 6d...52,603 tons..20s. 6d. Holywell 9s. 3d., 11s... 52,162 tons..20s. 6d., 21s.

(6) The earnings necessarily vary with the state of the coal trade—as it affects each colliery. They work altogether by the piece.

(7) There are some inconsiderable beds of ironstone, and some fire-clay in most of these collieries—the former not worth working.

(8) This "back" or cleat is a parallel and vertical cleavage of the coal, of which the pitmen universally avail themselves, in their principal excavations, (called "boards,") which are "driven" perpendicularly to it. The narrow passages used for travelling and air courses (called headways or endings) being parallel to the cleavage. There is generally a considerable uniformity in its direction throughout large districts of the coal-field—but occasionally variations occur in the same colliery, and in superincumbent seams.

(9) The workings extend from 10 to 14 fathoms *below* this depth, in consequence of downcast dykes and the declination of the seam—and the natural temperature of the strata contiguous to the lowest workings is reported to exceed 76° Fah.

Sir Charles Lemon observed, that the pitmen of the North, as he learned from this table, continued at their employment until they were seventy years of age. In Cornwall, they were seldom able to work after sixty. To what was this disparity attributable? He was inclined to think that it proceeded—in some degree, at least—from the different mode in which the men were brought out of the pits. In the North, they were drawn up—in Cornwall, they ascended by means of ladders, and the labour of the ascent tended to produce diseases of the chest.

The third paper read was, Mr. Wilson's Account of the Darton Collieries "Accident Club." This club was experimental, and instituted to ascertain on what terms a miner might ensure relief, during sickness arising from accidents. The Darton Club was established in 1833. A member whose wages do not exceed 7*s.* per week, pays 6*d.* entrance, and one halfpenny per week subscription, and receives 3*s.* 6*d.* per week when confined from injury received by accident; those whose wages are higher pay 1*s.* entrance, 1*d.* per week subscription, and receive when ill 7*s.* per week. It appears from the following abstract from the Society's books, that the allowance is not too large for the subscription:—

	Average number of Subscribers.	Accidents on which payment has been made.
1833	107	5
1834	158	33
1835	202	52
1836	224	45
1837	245	53
1838	277	22

The total amount of receipts was 258*l.* 18*s.* 8½*d.*, and of payments 208*l.* 2*s.* 10*d.*, leaving a balance of 50*l.* 10*s.* 10½*d.*

Mr. Felkin, of Nottingham, then read 'An Abstract of the Annual Report of the Overseers of the Township of Hyde, in Cheshire,' with explanatory statements, the result of recent personal inquiry. There are nine paupers resident in Hyde, four men and five women, of which the former received 26*l.* 10*s.* 6*d.*, and the latter 29*l.* 14*s.* 4*d.*; there were twenty-four other cases of pauper expense, which on the whole amounted to 207*l.* 3*s.* 10*d.* Fifteen fathers paid 62*l.* 13*s.* 9*d.* for their illegitimate children, and sixteen mothers received 64*l.* 12*s.* 10*d.* for the support of such children. This township contained in 1800 only 830 inhabitants, and the poor-rate was 12*s.* per head per annum. At present the number of inhabitants is 11,000, and the poor-rate is 6*d.* per head per annum. The inhabitants are principally employed in spinning yarn, and weaving power-loom cloth, in coal-mining to supply fuel for working the mills, and in the ordinary retail business of a small market town. The unusually low rate for the maintenance of the poor, induced inquiries into the state of the population. Mr. Felkin found from 1500 to 1600 hands employed in the mills he visited, and in other establishments there were 4500 hands. The number of steam-engines is thirty-five. The 1500 or 1600 first mentioned were paid fortnightly, at an average of 1000*l.* per week:—viz. children 3*s.* to 5*s.*; women 12*s.*; men 24*s.* or 25*s.* The exact average of weekly earnings had been ascertained to be 12*s.* 6*d.* A page of seventy-three names of men showed, on a fair average of earnings 22*9l.* per fortnight, which is 31*s.* 4*d.* a week each man, or 78*l.* 15*s.* per year. The average earning of 120 families, whose members were wholly employed in those works, was found to be equal to 6*s.* 10½*d.* per head, per week, including every individual of them. Some families were so large, and so many of the children employed, that the income of each was from 200*l.* to 300*l.* per annum, and one received upwards of 400*l.* per annum. In these works 48,000 lb. of cotton wool is spun into yarn, No. 24, and woven by 1200 looms working at the

rate of 125 shoots per minute, into 1500 pieces of twenty-five yards long, or twenty miles in length of cloth, averaging a yard in breadth. Few changes take place among the hands, and upon recently taking an accurate census it was ascertained, that none had ever been pauperized, nor had a relative living in the place who had received parish relief. There have been only three committals for felonies of importance, years, and these were not of major right days, and Twice a year the works are closed for the men during this time visit London, Liverpool, the Isle of Man, &c. These excursions are found highly beneficial, the men returning more contented with their own homes. The appearance of the people is, on the whole, healthy, and as clean as the nature of their several employments will permit. Great freedom is shown in the intercourse of the workmen with their employers, but without any appearance of disrespect. Some families, as it was well expressed, live a week too fast, and are always indebted to the shopkeepers, but thriftiness on the whole is on the increase. Ten of the men have built out their savings forty-six freehold houses, the average rent of 7*l.* 10*s.* each. One producing man, originally a destitute orphan, had young and laid out on mortgage upwards of 100*l.* saving man, who had not received high wages, and whose wife was so infirm, as to be carried to bed for more than twenty years, and who had also brought up seven children, has from his savings become possessed of seven houses, producing fifty guineas a-year. The houses constructed by the men for themselves are generally larger and more substantial than those built by the master. They were generally clean and well furnished. The operatives are benevolent to each other; are fond of music; a Bible or Testament was found in every house, and in most cases some political or religious books. An infant and day school are established under competent masters, and are well conducted. Vacant situations in the factory are filled almost invariably by aspirants on the spot. It was hoped, that this example of the effects, which have resulted from restraining influence and judicious kindness, might excite large manufacturers to similar exertions, and that their success would be proved by the best of all possible tests, the absence of pauperism.

SECTION G.—MECHANICAL SCIENCE.—THURSDAY.

C. Babbage, Esq. in the chair.—Prof. Willis described his instrument called the Odontograph, designed for enabling workmen to find at once the centres from which the two portions of the tooth are to be struck, so that the teeth may work truly together. The position of these centres is pointed out by theory, and this instrument may be considered as the practical means of carrying out the theory, (see last year's Report, No. 517). He also described the construction and use of some scales of measurement, invented by Mr. Holtzapfel.

'On Improvements in Ship Building,' by Mr. Lang.

Mr. Lang described and exhibited some models, illustrative of the safety keel, which had been introduced with great success; and mentioned instances in which vessels fitted with these keels had struck and come off without sustaining material injury. He then entered into some details respecting the proper construction of merchantmen, and exhibited some models of the bottoms of merchantmen, (see last year's Report, No. 518). He also exhibited a method of securing a round-headed rudder, and a model of a tube scuttle to admit light between decks, and which had been used with great success.

'On the use of Wire Ropes in deep Mines,' by Count Augustus Breunner.

There had been introduced into the silver mines of the Hartz Mountains, about seven years ago, ropes composed of twisted iron wire, as a substitute for the flat ropes previously in use. Since that time they have been adopted throughout the mines of Hungary and most of those in the Austrian dominions, to the almost total exclusion of flat and round ropes made of hemp. These iron ropes are of equal strength with a hempen rope of four times the weight. One has been in use upwards of two years without any perceptible wear, whereas a flat rope performing similar work would not have lasted much more than a single year. The diameter of the largest rope in ordinary use in the deepest mines of Austria is one inch and a half. This rope is composed of iron wires, each *two* lines in diameter; *five* of these are braided together into strands, and *three* of these strands are twisted tightly into a rope. Great care is requisite in making the rope that the ends of the wires be set deep in the interior of the rope, and that no two ends meet near the same part. The strength of these ropes is little less than that of a solid iron bar of the same diameter. The usual weight lifted is 1000 lb. The rope on leaving the shaft must be received on a cylinder of not less than eight feet diameter, and be kept well coated with tar. There is a saving of about one-third of the power in one case mentioned, for *four* horses with a wire rope are doing the same work as *six* horses with a flat rope. It was suggested by the distinguished foreigner, that the introduction of iron ropes for the flat ropes in our deep mines and coal-pits would be attended with the same, if not greater advantages than has attended their introduction into the mines of the Austrian dominions.

The President, Mr. Babbage, then called the attention of the Section to some specimens of a new method of wood engraving, by Mr. G. Woone [see *Athenæum*, No. 532], serving well to illustrate its use and applications, and exhibiting some beautiful coloured designs. He then observed that the next subject which would be brought before the Section was on the modes of traversing the ocean by means of vessels propelled by steam: and he hoped that whatever difference of opinion might be found to exist, he should not have to witness a departure from the tone and temper which had characterized their previous discussions. If any opinions had been expressed which subsequent experience had shown to be erroneous, the acknowledgment of that error was a triumph to knowledge.

'On Steam Navigation and a self-recording Steam Journal,' by Dr. Lardner.

Dr. Lardner said, no one could be more deeply impressed with the importance of the observations which had just fallen from the President than he was; and there was not any member of the Association more willing to admit the error into which he had fallen than he should be found to be. It was, however, a matter of no real importance how far any opinion which he might have formerly expressed on extended steam navigation was right or wrong, except so far as it had been made a personal question. The subject was first broached at the Bristol Meeting of the British Association, when a discussion arose upon it, and he then remarked, that it was a great experiment which had not yet been attended with any satisfactory result. Unquestionably, he did express a discouraging or unfavourable opinion as far as regarded the probability of ever maintaining an unbroken intercourse by means of steam navigation between Great Britain and New York. But he had been charged with declaring that the transit by steam navigation between Great Britain and New York was a physical impossibility. He never had given expression to such a statement, or to anything equivalent to it; and, as a proof, he read a passage from the article on Steam Navigation which appeared in the *Edinburgh Review* soon after the Bristol meeting, and which expressed the opinions he then held. He must, however, now acknowledge that the success of the *Great Western* steam ship had shaken the opinions he then entertained, and should the same success continue throughout the various seasons of the year he would be the first to come forward and acknowledge himself completely in error. Dr. Lardner then proceeded to the proper subject before the Section, namely, the duty of marine engines, for ascertaining which a sum of money had been last year granted by the Association. He had been in communication with many steam navigation companies, and found that it would be a hopeless task to attempt to get the men on board the vessels to register with accuracy all the various facts required to be registered. He had consequently considered how this might be done by machinery, and the result was the construction of the instrument before them, and which he termed a steam journal. By this he proposed to register every five minutes the following varying phenomena, on which the efficiency and performance of steam-engines depend:—the pressure of the steam between the slides and the steam valve, —the pressure in the boiler,—the vacuum and the quantity of water in the boilers,—the saltness of the water in the boilers,—the velocity of the paddle-wheels,—the draft of the vessel,—the trim of the vessel,—the rate of the vessel,—the course of the vessel,—the apparent force of the wind,—the apparent direction of the wind. All these, excepting the course of the vessel, it is intended to register by self-acting mechanism. The methods by which this was proposed to be effected he then explained by reference to detailed drawings.

'On Steam Navigation,' by Mr. J. S. Russell.

The object of this communication was to endeavour to point out the means which might be attempted, with the greatest probability of success, for improving steam navigation. It was of importance to consider whether they should look to some new, and as yet untried, method, or to improved combinations of the means already in common use. The latter was the better course; and these improvements might be in the vessel itself, in the machinery, or in the nature and application of the fuel. Mr. Russell then adverted to the fallacy of maintaining, as some persons did, that the form of the vessel was alone to be considered, while others held the directly contrary opinion, that an increase of power alone was to be considered. Mr. Russell, however, considered, that in the present state of steam navigation, the opinions of the former were most to be attended to. With reference to these questions, two great experiments had, he said, been made. Two fifty horse power engines had been taken out of a vessel, and two sixty horse power engines put in their place. When the propelling power was two fifties, the velocity of the vessel was ten miles and three-quarters per hour. When it was two sixties, the velocity with which the vessel moved was ten miles and six-tenths per hour. Here then was an increase of power, a greater expenditure of fuel, and the increase of the velocity was only three-tenths of a mile. Another experiment was made on two vessels, one of 450 tons and the other of 500 tons burthen. The larger vessel was propelled by two engines of 300 horse power, and the smaller one by two of 150 horse power. The larger vessel, with the double power, proceeded at the rate of nine miles and a half an hour, whilst the smaller one moved at the rate of nine miles and a quarter an hour. This instance he thought extremely satisfactory; the smaller vessel had the proper form that a vessel should have, and the larger one had not. He was, therefore, of opinion, that the form of the vessel was the direction in which we should look for improvement. Indeed, he thought it probable, that ere long we should have vessels of double the length, for a given breadth, that they at present generally are. The objection to an increased length, from the danger of what is called "breaking the back," might be in a great measure removed by a proper system of diagonal framing. Another important consideration is, that the linear dimensions of a vessel being doubled, the capacity is increased eight-fold, but the increase in the resistance need not be more than two-fold.

OUR WEEKLY GOSSIP.

Our scientific labours are now drawing to a close: next week we shall conclude our report. By way of general observation, we have only to add, that the Meeting and the Dinner of the members of the Natural History Society went off admirably—between four and five hundred persons were present;—that among the many places of interest freely opened to the members of the Association, was the exhibition of the Society for the Promotion of the Fine Arts;—and that the Master and Brethren of the Trinity House presented the freedom of their corporation to Captain Sir George Back and Captain J. C. Ross. We must now take up the history of events, and record a little of the gossip of the last three weeks.

The Wellington memorial still holds its place and interest in public conversation. A general meeting of the dissentient members of the Committee met lately at Lord W. Bentinck's, when it was agreed to address a letter to Lord Melbourne, from which the following is an important extract:—

"The continued determination of the Duke of Rutland not to convene a regular meeting of the Committee to reconsider the former resolutions, and the impossibility of assembling, at this advanced period of the year, a general meeting, at which the matter in dispute might be referred to the decision of the Subscribers at large, compel us to

apply to your Lordship for the purpose of requesting that her Majesty's government will suspend their consent to any plan which may be submitted for their approval, until the whole question shall have been considered at a full meeting of the Committee, and, if necessary, at a general assembly of the Subscribers."

This letter was signed by the following noblemen and gentlemen, members of the Committee:

Northumberland,	Mountstuart Elphinstone,	Duncannon,
Powis,		C. Anson,
Richmond,	J. R. Carnac,	J. Abercrombie,
Buccleugh,	W. C. Bentinck,	E. Kerrison,
Liverpool,	C. J. London,	T. Strange,
Stratford,	Anglesea,	Lynedoch,
N. Ridley Colborne,	Tavistock,	Craven,
Palmerston,	W. Anson,	Combermere.

We hardly need add, that Lord Melbourne promised compliance with so reasonable a request. The propriety of erecting any memorial on the arch at Hyde Park Corner, has been very much questioned; but it seems generally agreed, that we were correct respecting the wrong position of the figure lately placed there. The hero, on the top of a triumphal arch, is supposed to form a part of a procession, and must be on a line with the triumphal way, and not at right angles to it; and we have not heard a single example referred to in justification of the proposed deviation from established usage. Ere we take leave, once again, of this "pleasant history," we must not forget to mention the lithograph of M. Marochetti's Philibert-Emanuel. Had this print been circulated some months since, any correspondence on the part of the clever foreigner would have been superfluous. The difference between the two figures—the mailed knight, and the gentle, pig-tailed monarch—would have spoken for itself, rendering explanation or disclaimer totally unnecessary.

From the interest which this subject has awakened, and from other equally intelligible manifestations of opinion, we begin to hope that a feeling for art, and a consciousness of its beneficial influences, is fast spreading among the great body of the people. Statues of memorial are springing up in many provincial towns. At Newcastle, during the great festival week, the statue of Earl Grey, executed by Mr. Baily, was raised to its post of honour. The height of the entire work, including the figure, is stated to be 133 feet. Within the pillar, which is of the Doric order, is a staircase, the summit of which commands a bird's-eye view of the town and its vicinity. Nor less gratifying was the meeting held in the same town on Monday week, for the purpose of erecting a memorial to Collingwood, a hero of whom England is justly proud, and whose memory must be doubly dear to his townsmen. The attendance was numerous, a committee was immediately formed, and a large subscription made, before the meeting broke up. We might have noticed some fortnight ago, had we not been compelled to postpone everything of the sort, that the "ladies of the vale" (as the fantastic Lichfield coterie used to style the twin spires of their beautiful cathedral,) now look down upon an effigy of *their* Boanerges, Samuel Johnson—a statue of the bulky sage, by Mr. Lucas, of Salisbury, having been lately erected in the market place. On the pedestal, are three scenes in *relievo*, one representing the voluntary penance to which he exposed himself, of standing bare-headed in the market place at Uttoxeter, by way of expiation for an act of disobedience to his father. Manchester—not to be behind other towns in the race—is planning, we are told, similar tokens of respect to *her* celebrities; memorial statues being talked of, or bespoken, of the Duke of Bridgewater, Watt, and Dalton. Meanwhile, in the north, the late Duke of Sutherland is about to be exalted on one of his own hills, after the fashion of San Carlo Borromeo—that is, in a colossal form, after a design of Sir Francis Chantrey's. We cannot help adding to this paragraph, a notice, that the little monumental chapel, in the church of Lacken, near Brussels, destined to receive the statue of Malibran, is announced, by the continental journals, to be just finished, and ready for its occupant. From travelling rumours, we should not be surprised if, before the work is complete, we hear of the marriage of the widower with the sister of the deceased. Her (Mdlle. Garcia's) musical powers are described as fulfilling the highest possible expectations.

This talk of monuments brings once again to our recollection the exclusion of Lord Byron's bust from Westminster Abbey—a subject too closely connected with the literary history of the times, to be indifferent to the readers of the *Athenæum*. Like everything else in English affairs, it has been treated as a question of party; and the judgments passed on the transaction have been deeply coloured with those one-sided notions of sect and faction, which but too generally stand among us in the place of truths. To the literary reputation of the noble Lord, the matter may not, perhaps, be of much consequence: the memory of an author lies not in his material image; and if the absence of Lord Byron's effigies from Poet's Corner act upon the foreign spectator like that of the images of Brutus and Cassius on the Roman people at the funeral of Junia, the reproach will belong to those only who are responsible for the exclusion. But the inference to which the transaction may lead, that the English nation are dead to all principles more transcendental than those of Whig and Tory, of Churchman and Dissenter—that they can with difficulty rise to the conception of our common nature in its wholeness, and are so sunk in petty and personal interests, as to be scarcely capable of relishing the great, the beautiful, and the true, is a theme of universal concernment; and there is not a man, be his station what it may, who has not his part in the consequences. It is by no means a difficult matter, in addressing the prejudices and the ignorances of the multitude (well-dressed or ill-dressed), to make out a plausible case for or against the Dean and Chapter of Westminster. It requires only to ring the changes on a few meaningless generalities—the sanctity of Christian burial, pious scruples, high notions of clerical duty, on the one hand—genius, talent, a nation's property in its authors, &c., on the other—and the impression is made. The partizans are furnished with something plausible to say to each other, and nobody listens to an opponent. But we are bold to assert, that, in a community feeling keenly the dignity of truth, and justly appreciating the duties of man to his Creator and to his species, no functionary would be found, however exalted his station, so bold as to affront public opinion by such an act. In a sound state of society, the dead, possibly, would not be buried in churches, or sepulchral monuments be permitted to divide attention with the altars of the deity; but if such were still the usages of the country, sectarian warfare would not be carried beyond the grave, nor would any individuals or body of men feel themselves strong enough "to deal damnation round the land," and make their own opinions the measure of other people's consciences. Taking things, however, as they are, and making a liberal allowance for good intentions, we still think the Dean and Chapter so far in the wrong, that custom has ruled the case against them. Poet's Corner, whatever it may have once been, is no longer sacred to religion—it is no longer a mere place of Christian burial for those who die in the bosom of the church; it is now sanctified to the nation's gratitude for public services—its reverence for its own greatness. Men of all religious opinions have been brought there, to whom the nation desired to do honour, and vice and virtue have found a common refuge there in the equality of death. Admitting, therefore, that our churchyards should be accessible only, like the Necropolis of the Egyptians, after a verdict on the whole life of the deceased, and that the clergy are the authorized Rhadamanthuses for issuing the passport; and allowing that an incontrovertible case could be proved against Lord Byron's opinions or morals (which we strenuously deny), still we feel, that the exclusion exhibited less wisdom and good feeling than might have been expected of the reverend functionaries—and with the motives of the parties we have nothing to do. With a view to obviate the scandal in future, it has been proposed to establish a secular receptacle for the monuments of the great and the deserving, inaccessible to theological dispute and sectarian jealousy. This, in the origin, would have been a good arrangement, in more than one sense; but it is now too late; custom has taken possession of the Abbey, and every better association of ideas will still keep its "snug lying" an object of legitimate ambition; so that the bare fact of no monumental inscription being found there, will operate as a conviction of heresy and immorality against the illustrious excluded. The memory, too, of the occasion which called into being this new establishment, would survive, to the latest time, a reproach against the church itself whose views of Christian charity and Christian duties it would so unhappily signalize. We hope, therefore, on all accounts, that the authorities will re-consider the matter, and reflect how little they serve the sacred cause of religion (still less of establishments), by a rigour which even candour itself might conscientiously deem pharisaical.

In music, our rumours are rather of foreign than of home matters; beginning with the new opera of *Benvenuto Cellini*, by M. Berlioz, which was to be represented, for the first time, at the *Académie Royale* this week. A new opera, by Auber, in five acts,—may it prove a second 'Masaniello!'—will succeed this work by M. Berlioz. The recent death and burial of M. Lafont, the second tenor at the French Opera, increases that establishment's need of vocal reinforcement; Duprez being its one stronghold, and *his* voice, we are sorry to hear, manifesting wear and tear more than is natural or welcome. The Italians are to be sheltered, for the winter, at the *Odéon*,—their best promise, in the shape of novelty, being the revival of '*Zelmira*;' one of Rossini's grandest and most sterling operas, though based upon a clumsy and improbable story. Till the 1st of October, however, they will be found in England, making provincial tours; Grisi, Albertazzi, Ivanoff, and Lablache, being the foreign stars to appear at the Gloucester Festival next week. Our *Opera Buffa* company is likely, we are told, to remove from the Lyceum to the St. James's theatre; a comfortable change for west-end subscribers. To end at home, we must notice the engagement of Tillè and the rest of the *bayadère* corps by Mr. Yates, for the Adelphi,—the appointment of Mrs. Nisbett as *locum tenens* to Madame Vestris at the Olympic,—and (something more legitimate) the approaching opening of Covent Garden theatre on the 24th of this month. A play, by Mr. Leigh Hunt, has been talked about, as one of Mr. Macready's novelties, and the 'Tempest' as the work of Shakespeare's selected for its first night. We are positively, it is now said, to have a grand German Opera, under the conduct of the Chevalier Spontini, and to hear, at last, the great works of Gluck—the '[illegible]meneo' of Mozart—Weber's operas—and the conductor's own 'Vestale,' performed as it ought to be. We wish Laporte would meet these energetic measures,—the scene of which is to be at Drury Lane, in the best spirit of rivalry,—by relying next season, on works as well as singers; by opening, for instance, with 'Guillaume Tell,' as it ought to be, and *might* be performed.

Among other matters postponed on account of the Newcastle meeting, were ten words of notice of the farewell dinner given to Mr. D. Roberts, by his brother artists; that excellent painter being about to proceed to Egypt, for the purpose of making drawings of the antiquities of that country.

Another subject which has engrossed a good deal of public attention, is Mrs. Norton's letter, in reply to the personalities in the last number of the *British and Foreign Review*, and which, no doubt, our readers have seen in the daily papers. It is a vigorous, searching, and uncompromising exposure of the falsehoods by which she has been attacked, written in a spirit becoming an injured and insulted woman.

The French papers tell us that a Sig. Guglielmo Marzano has published, in the *Venice Gazette*, of the 14th of September, an important discovery which he has made in searching through the private archives of the town of Bologna. He professes to be able to prove that *La Pucelle d'Orléans* belonged to the old family of the Marquis Ghislieri, that she was the daughter of Ferrante Ghislieri, who was obliged to fly from Bologna in the year 1401, when Giovanni Bentivoglio usurped the sovereign power in that republic.

DIORAMA, REGENT'S PARK.

This Establishment will be CLOSED for the Season on SATURDAY, the 29th instant, arrangements having been made for sending the two Pictures now exhibiting abroad. They represent TIVOLI, with a View of the Cascades, and the Interior of the BASILICA of ST. PAUL, before and after its destruction by fire. Painted by Le Chevalier Bouton. Open from 10 till 5.

POLYTECHNIC INSTITUTION,

Incorporated by Royal Charter,

NOW OPEN, 309, REGENT-STREET, near Langham-place, extending into Cavendish-square.—The Great Hall has a surface of 700 feet of water, in which a Diver is at work, and into which a Diving-bell descends with four or five persons.—In the extensive Rooms are arranged the most interesting Models and Machinery, some of which are in motion by Lord Dundonald's Rotary Steam Engine.—A magnificent Hydro-Oxygen Microscope by Cary, and many interesting Works of Art.—Open daily from Ten o'clock to Six o'clock.—Admission, 1s.

N.B. A Lecture on some Scientific subject delivered every day at 2 o'clock.

MUSIC AND THE DRAMA

'A Lesson for Ladies' was read by Mr. Buckstone, at the Haymarket, on Wednesday; but, though taken from the French, it proved dull and unintelligible: indeed, the point of the moral is not very apparent. We attribute this to the circumstance of the translator having adhered too closely to the original, so that he has lost the *esprit* of the dialogue, and marred the equivoque of the plot, without making up for his bungling version by original drolleries. The story includes the well-worn incidents of a mother assuming that the attentions of the lover of her daughter are directed to herself; and the miscarriage of billets by a drunken messenger, too stupid to perform his errand honestly, but cunning enough to take a bribe to do mischief. This booby marplot—the only comic character in the piece—is played by Buckstone with his usual buffoonery. The rest of the *dramatis personæ* are mere automata. Mrs. Glover leered and ogled, Miss Taylor sulked and stormed, Mr. Webster raised his eyebrows, and Mr. Walter Lacy, the new *Charles Surface*, was awkward and perplexed. Mrs. Fitzwilliam mimicked Grisi and Rubini, in a mock Italian *scena*, with the glorious contempt for tune, in keeping with her assumed character of a *soubrette*: she also danced the cachoucha very gracelessly, but it was not half so funny as the performance of the fat little lady at Albertazzi's benefit, though the oddity of the thing was increased by the castanets being snapped by proxy. Buckstone was overwhelmed with applauses for his "original" production; and being, luckily, rouged very thickly, was able to give it out for repetition, nightly, without showing his blushes.

All the town is flocking to Astley's "to see the lions." A M. Van Ambrugh has so trained some wild beasts, that one scene of the Millennium is literally enacted, and "the lion lies down with the lamb." Not only does the tiger-tamer put his head into the lion's mouth, but a more tempting morsel—a living child—is offered to the monarch of the forest, without so much as making his mouth water. We have not been at the trouble to witness these wonders, for we see no reason to doubt them, inasmuch as a no less extraordinary sight has been beheld, for years, over Waterloo Bridge; where, in a cage, cats, birds, and such like "natural enemies," dwell together very contentedly. But then, to be sure, there is little danger: a cat killing a bird is common; whereas, if the lion *should* take a fancy to the child, or to the man's head—how very exciting!

Poor old Barnes, the favourite Pantaloon—the most senile of old men in Grimaldi's time, when Clowns were humorous and Pantaloons decrepit—has really fallen into the condition he so successfully assumed on the stage, and a benefit was got up for him at the English Opera House, on Wednesday, which, we are happy to hear, promises to relieve his "severe distresses." He appeared on the stage, looking the 'lean and slippered Pantaloon' but too well; and received the pantomimic homage of a whole troop of his motley brethren, amid the cheers of the audience. We think this mummery had better have been omitted: but '*de gustibus*——'

MISCELLANEA

The Chevalier Cuvier.—[From a Correspondent.]—The death of the Chevalier Frederic Cuvier, (the news of which reached us some time ago,) has awakened the deepest regret among a numerous circle of friends and savans. This excellent man was on his return to Paris, from one of those annual journies which his office of Inspector General to the University obliged him to make, and was seized with paralysis at Strasbourg; the alleviation is contained in the reflection, that he was in this city surrounded by friends and the best medical aid, but neither affection nor skill could avail, and in four days he was no more. He was born at Montbéliard, in 1773, was called to Paris by his illustrious brother, Baron George Cuvier, and became keeper of the menagerie at the Jardin des Plantes, in 1804, a place which enabled him to make some precious observations on the economy and physiology of animals. These are published in the *Annales du Muséum*, and, with other valuable works on natural history, led to his election into the Academy of Sciences, to the Inspector Generalship of the University, to the Legion of Honour, to the Royal Society of London, and lastly, to the chair of comparative physiology at the Jardin des Plantes. A remarkable coincidence exists between his death, and that of his brother; like him, he was about to deliver a fresh course of lectures, was attacked by paralysis, was aware from the first moment of the result which must ensue, was anxious to secure the welfare of others, was patient under severe sufferings, and was ready to meet his God. As a scientific man, his loss will be severely felt, for not only did he write the abovementioned works, but was a contributor to several of the journals of science, and the principal labourer in the Histoire des Mammifères, published in conjunction with M. Geoffroy St. Hilaire. As a father, a friend, and a brother to the bereaved widow who is thus again visited by heavy calamity, his loss is irreparable; and as a master, the very quadrupeds of the Jardin will feel the loss of his benevolent cares. M. Cuvier has left a son, who bears his noble name with honour.

Artesian Well at Paris.—The boring, to which we have so often alluded, has now reached the depth of 410 metres, or about 1345 feet. The funds being exhausted, M. Elie de Beaumont was requested to examine the soil lately brought up, and to say whether it affords any indication by which the thickness of the bed to be pierced, before arriving at the sand, might be inferred; and he has given it as his opinion, that the bore has reached the lower beds of the chalk formation, and that the marls, &c. which still intervene between the bore and the stratum, where the water will be found, will probably, be less than 100 metres, or 328 feet thick. If M. de Beaumont's anticipation should prove correct, the well will have a depth of 1,600 feet; and, according to recent calculations, the water it is said would have a temperature sufficiently high to furnish Paris with an abundant supply of hot water for baths, and other purposes.

Geology of the Cordilleras.—M. Gay continues his researches with respect to the geology of the Cordilleras with great zeal. He has repeatedly traversed that part of the chain which belongs to Chili, and is convinced that trachyte has had nothing to do with its formation. All the shelly strata which he has observed contain Gryphites, Terebratula, and Ammonites, &c., and therefore belong to intermediate and secondary formations. At the height of more than 4,317 yards he met with a formation which was perfectly Jurassic. The discoveries of M. Degenhardt, a native of Clausthal, and director of the mines of Marmato, in Columbia, and of M. de Humboldt, present nothing which can be referred to the Jura; and M. von Buch asserts, that there is nothing of it in North America or in Brazil from the coasts to the Andes. If, therefore, M. Gay have discovered this formation without the mixture of any characters which are foreign to it, he has reached a fact which is wholly new to the geology of the American continent. There is, however, some reason to suppose that he has only met with that great system of chalky strata which approaches the character of the Jura, and of which M. von Buch has frequently spoken.

Arabs.—Baron Larrey has read a memoir at the French Academy of Sciences, which sets forth his observations on the Arabs; observations which have led him to conclude, that they spring from the primitive race of the earth. He states, that their physical frame is more perfect in every respect than that of other men, and even their peculiarities tend to give them strength, and agility. The circumvolutions of the brain are more numerous, and the substance of this organ denser and firmer than that of other races. The nervous system is also more dense than that of Europeans; the heart and vascular system present the greatest regularity, and the most perfect developement; their senses are exquisite. To these physical superiorities the Baron adds the gift of superior intellect, an observation scarcely borne out by their present condition.

Errata.—The error referred to by G. A., page 633, col. 1, line 26, of Pinus *satanica* for Pinus *taurica*, and some others of minor importance, were corrected before the whole impression was struck off. Others escaped observation; thus, page 619, col. 1, last line, for *lower* read *farther*; again, page 619, col. 2, note, line 15, for *wave* read *vane*; page 637, instead of *Cliff's* Dry Gas Meter read *Glegg's*, and line 70, strike out *the gasometer*, and line 72, for *top* globe read *lower*.

ADVERTISEMENTS

UNIVERSITY COLLEGE, LONDON.

FACULTY of ARTS.—SESSION 1838-9.—The Session will commence on Monday, October 15, when Professor MALDEN will deliver an INTRODUCTORY LECTURE, at Two o'clock precisely. CLASSES.

LATIN..Professor Key, A.M.
GREEK..Professor Malden, A.M.
HEBREW..Professor Hurwitz.
ORIENTAL LANGUAGES..Professor Falconer, A.M.
CHINESE LANGUAGE..Professor the Rev. S. Kidd.
ENGLISH LANGUAGE and LITERATURE..Prof. Rogers.
FRENCH LANGUAGE and LITERATURE..Prof. Merlet.
ITALIAN LANGUAGE and LITERATURE..Prof. Pepoli.
GERMAN LANGUAGE..Teacher, Mr. Wittich.
MATHEMATICS..Professor De Morgan.
NATURAL PHILOSOPHY and ASTRONOMY..Prof. Sylvester.
ZOOLOGY, RECENT and FOSSIL..Professor Grant, M.D.
PHILOSOPHY of the MIND and LOGIC..Professor the Rev. J. Hoppus, Ph. D.
HISTORY..Professor the Rev. R. Vaughan, D.D.
CIVIL ENGINEERING—Professors De Morgan, Graham, and Sylvester.

In English Law, Geology, Geography, Statistics, and Political Economy, and Sanscrit, the Professorships are at present vacant.

A Professor of Law will be appointed early in the Session.

DEGREES.

Students of this College, as one of the Institutions connected by Royal Charter with the University of London, will be entitled to be examined for Degrees in Arts and Law, and for Honours, Exhibitions, and Scholarships, to be conferred by the Senate of the University.

The Matriculation Examination has been fixed for Monday, 5th of November, 1838.

The Examinations for the Degrees of B.A. and M.A. are announced to take place in May or June, of B.L. in November, once a year, commencing in 1839.

FLAHERTY SCHOLARSHIPS.

A Flaherty Scholarship of £50 per annum, tenable for four years, will be awarded in 1839, by Examiners to be appointed by the Council, to the best proficient in Classics amongst the Students of the College under twenty years of age. The examination will take place in the second week in October. Students entering in October, 1838, being in other respects qualified, will be admitted to competition in common with those of preceding years. Printed copies of the regulations concerning these Scholarships, prospectuses of the classes, and any other information that may be required, may be obtained on application at the Office of the College.

JOHN HOPPUS, Dean of the Faculty.

August, 1838. CHAS. C. ATKINSON, Secretary to the Council.

The Session for the Faculty of Medicine commences on the 1st October.

The Junior School will re-open on the 25th September.

SCHOOL of DESIGN for the EDUCATION of ARTISTS and INSTRUCTION of AMATEURS in the PRINCIPLES and PRACTICE of DRAWING and PAINTING, possessing every requisite for the study of the human figure, anatomically, as well as in the developement of its perfect beauty, combined with the other branches of the Fine Arts, forming also a Probationary School for the Royal Academy. Terms may be known at No. 6, Charlotte-street, Bloomsbury, corner of Streatham-street.

WESTMINSTER HOSPITAL.—At a Special General Board, convened to receive the Report of the Committee appointed to manage the late Coronation Musical Festival in Westminster Abbey, and the erection of Seats to view the Coronation Procession,

THOMAS AMYOT, Esq. in the Chair;

The Report stated, that the total Receipts for the Rehearsal and Performance amounted to £7186 13 6
And the total disbursements to 2143 3 5

Leaving a nett profit of £5043 10 1

Which latter amount, being divided in the proportions previously agreed upon by the representatives of the different Charities, gave—

To the Westminster Hospital £3362 6 9
To the Western Dispensary 1008 14 9
To the St. Margaret's and St. John's Sunday and Infant Schools 672 9 4
£5043 10 1

And these Sums have been paid over to the Bankers of these Charities respectively.

It further appeared that the sums received for Sittings, &c. to view the Procession, amounted to £1180 10 3
And the expenses to 549 13 3

Leaving a nett profit to Hospital of ..... £ 630 17 3

Resolved,

That the Report be received, and that the cordial thanks of this Board be given to the Committee for their services.

That the warmest and best thanks of this Board be presented to the Right Hon. the Earl of Eldon, for his constant attention as Chairman of the Committee, and for the great liberality with which he promoted the success of the undertaking; to Charles William Hallett, Esq., one of the Treasurers of the Hospital, for the zeal, promptness, and ability with which he directed his unwearied attention to the general details; and to William Ayrton, Esq., for his highly-important and valuable services in undertaking the whole arrangement of the musical department, contributing, by his judgment and experience, in a marked degree, to the success of the undertaking; and that, as a further compliment to these Gentlemen, their sons, James Alfred Hallett, Esq., and Scrope Ayrton, Esq., be elected Honorary Life Governors.

That Madame Grisi be elected an Honorary Life Governor, and that the thanks of this Board be communicated to her for her gratuitous and invaluable services.

That the thanks of this General Meeting be given to William Freeman, Esq., John Johnson, Esq., and Thomas Wood, Esq., for their zeal and exertion in conducting the arrangements for the erection of seats for viewing the Coronation Procession, by which the clear sum of 630*l.* 17*s.* 3*d.* was obtained for the benefit of the Hospital.

That an abstract of the very gratifying Report submitted by the Committee this day, be advertised in several Papers.

THOMAS AMYOT, Chairman.

The Governors and supporters of the Westminster Hospital, in drawing the attention of the public to the gratifying result of their late undertaking, cannot help respectfully urging that there still remains much to be done in order to complete the grand object they have in view, viz. opening the doors of the Hospital to the full number of patients for which it was originally designed. They have, during the last twelve months, opened three additional Wards, but they are only now enabled to accommodate 150 patients, while the building is capable of holding upwards of 200, if there were sufficient funds for their support.

As the Governors are determined that the unexampled success of the late enterprise shall only stimulate them to fresh exertions for the benefit of the Charity, they confidently trust that it will rather increase than diminish the interest which benevolent persons will feel in contributing to the fulfilment of their design.

SOCIETY for PROMOTING PRACTICAL DESIGN, SAVILLE HOUSE, Leicester-square.—The Council have determined that, in addition to the EVENING SCHOOLS, the Rooms shall be open from 11 to 4 EVERY DAY, from Monday, Sept. 10.—Charge to each Pupil, 1l. 1s. per quarter.
By order of the Council,
W. M. CHATTERLEY, Sec.

ST. BARTHOLOMEW'S HOSPITAL—LECTURES.—WINTER SESSION, 1838.
To commence October 1.
Medicine, by P. M. Latham, M.D., and G. Burrows, M.D.
Anatomy, Physiology, and Pathology, by E. Stanley, F.R.S.
Practical Anatomy, by Mr. Wormald.
Superintendence of Dissections, by Mr. Wormald and Mr. M'Whinnie.
Surgery, by William Lawrence, F.R.S.
Chemistry, by W. T. Brande, F.R.S., and Mr. Griffiths.
Materia Medica and Therapeutics, by G. L. Roupell, M.D.
Midwifery, and the Diseases of Women and Children, by E. Rigby, M.D.
SUMMER SESSION, 1839.
To commence May 1.
Forensic Medicine, by A. J. Farre, M.B.
Midwifery, and the Diseases of Women and Children, by E. Rigby, M.D.
Botany, by F. J. Farre, M.D. F.R.S.
Comparative Anatomy, by A. J. Farre, M.B.
Practical Chemistry and Natural Philosophy, by Mr. Griffiths.
Clinical Lectures—On Medicine, by Dr. Latham and Dr. Roupell: and on Surgery, by Mr. Lawrence and Mr. Stanley.
Prospectuses of the Lectures, and a Statement of the Arrangements of the School, may be obtained by application at the Anatomical Theatre, or at the Museum.

ENVELOPES 2s. 3d. per hundred, or 21s. per 1000; Envelopes black bordered, for mourning, 6s. per hundred, per 1000, warranted of the best paper.—An extensive and elegant assortment of Envelope Cases, filled with Envelopes, from 8s. 6d.—Name-plate elegantly engraved, and 100 of superfine cards printed, for 5s.—Writing Papers of every description at wholesale prices—Superfine Bath Post, 9s. 6d. per ream, or 6d. per quire, not Outsides—Note do. 6s. per ream, or 4d. per quire—Travelling Writing Cases, Dispatch Boxes, Wellington Cases, in Russia and other leather, from 15s. 6d.—Blotting-books at 1s. 6d.; ditto, with locks, 4s. 6d. The most choice Selection of Bibles and Prayer Books in London. The whole of the above articles at 10 per cent. under any house in London.—To be had at STOCKEN'S, 53, Quadrant, Regent-street. — Country orders punctually attended to.

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Capital £500,000.
Directors.
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James Cockburn, Esq.	Major-Gen. Archibald Robert-
James Law Lawes, Esq.	Daniel Sutton, jun. Esq.
John Knill, Esq.	O. B. Bellingham Woolsey, Esq.

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Surgeons—James Farish, Esq., and John Dalrymple, Esq.
Standing Counsel—Hussell Gurney, Esq.
Solicitors—Messrs. Lake & Curtis.
Actuary—Edward Baylis, Esq.
One of the leading features of this Office will be the Assurance of Lives FOR SUMS AS LOW AS 50*l.*, so as to extend more universally the important benefits resulting from a well-regulated system of Life Assurance.
Another peculiar advantage offered by this Society will be THE ADVANCE OF MONEY IN SUMS OF 200*l.* AND UPWARDS, either by way of Loan or Annuity, subject to the borrowers' effecting Policies with the Company to the amount of such advances, and providing approved security.
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